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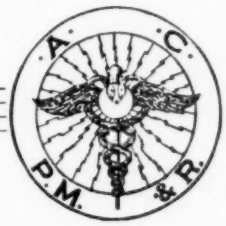

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VOLUME XXXV MARCH, 1954 NO. 3

ANNUAL SESSION • WASHINGTON, D.C. • SEPTEMBER 6-11, 1954

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32nd Annual

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and

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SEPTEMBER 6-11, 1954

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Contents — Mar. 1954

Volume XXXV No. 3

ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION

(Formerly Archives of Physical Medicine)

30 North Michigan Avenue, Chicago 2, Illinois

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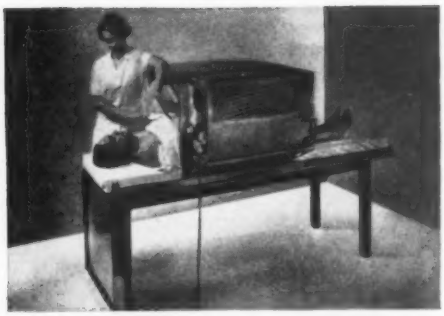

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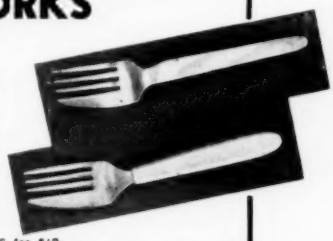

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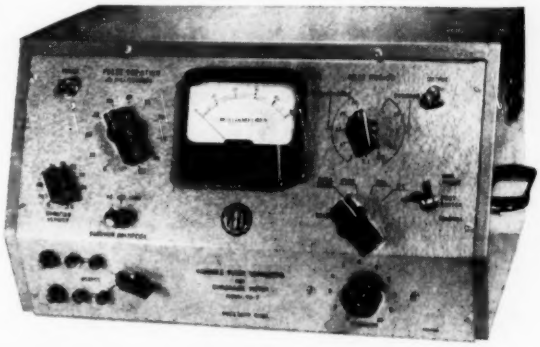

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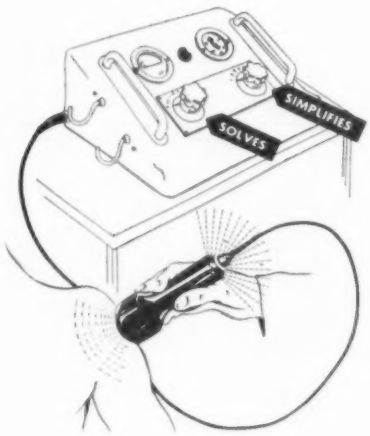

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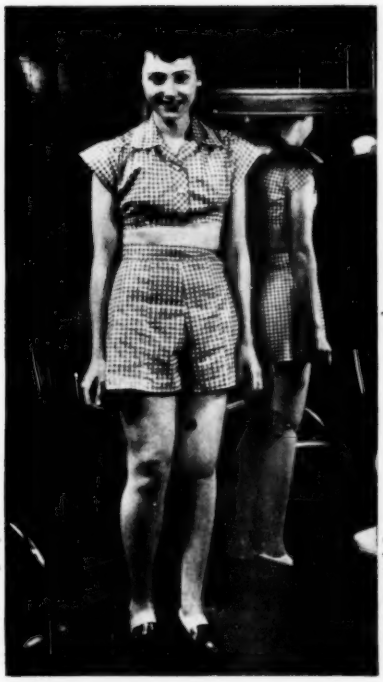

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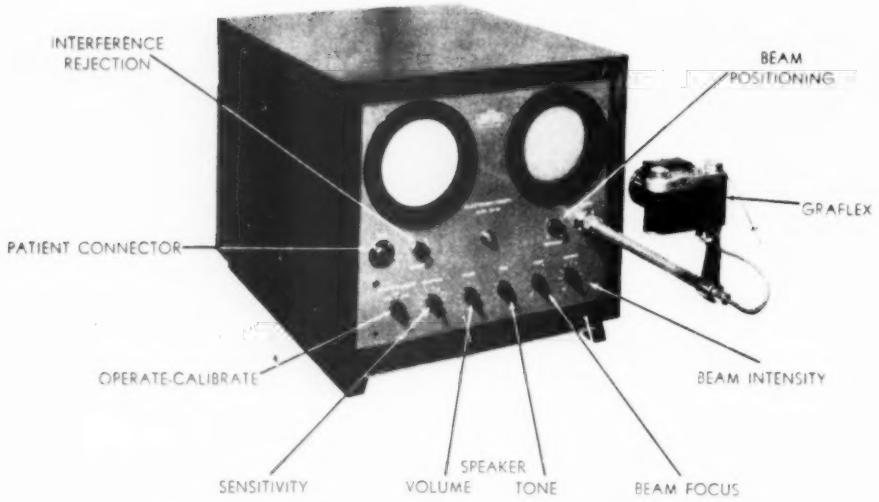

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In conjunction with the New England Society of Physical Medicine, the Section on Physical Medicine of the Medical Society of the County of Kings, the New Jersey Society of Physical Medicine, the New York Society of Physical Medicine, and the Pennsylvania Academy of Physical Medicine and Rehabilitation.

SATURDAY, APRIL 10, 1954, NEWARK, NEW JERSEY

MORNING SESSION — 10:00 A.M. — Veterans Administration Hospital, Tremont Avenue and South Centre Street, East Orange, New Jersey. Public Service bus #44 (Tremont) from Pennsylvania Railroad in Newark stops at gate. Via auto follow Central Ave. in Newark to South Centre Street in Orange, turn left and and follow to hospital.

AFTERNOON SESSION — 2:00 P.M. — Academy of Medicine of New Jersey, 91 Lincoln Park, Newark, New Jersey.

DINNER AND EVENING SESSION — Essex House Hotel, 1050 Broad Street, Newark, New Jersey. (Across Park from Academy)

10:00 A.M. — Morning Session at Veterans Administration Hospital, Tremont Ave. and South Centre St., East Orange, New Jersey.
Registration followed by inspection of Physical Medicine and Rehabilitation facilities in clinics and wards.
Charles R. Brooke, M.D., Chief, Phys. Med. Rehab.

10:45 A.M. — Clinical Session — Conference room 4-44, fourth floor.
a. Presentation of rehabilitation cases including paraplegics: demonstration of technics.
Thomas J. D. Scanlan, M.D., Ass't. Chief, Phys. Med. Rehab.

11:30 A.M. — b. Presentation of Peripheral Vascular Disease Cases: Oscillom. Studies, X-rays, Arteriography, and results of treatment.
Bror S. Troedsson, M.D., Attending Specialist, Phys. Med. and Rehab.

1:00 P.M. — INFORMAL LUNCHEON at Essex House Hotel, Dining Room.

2:00 P.M. — AFTERNOON SESSION at Academy of Medicine of New Jersey, 91 Lincoln Park, Newark, New Jersey.
REGISTRATION

Symposium on Disabilities of the Hip Joint

1. Orthopedic Management of the Coxarthroses.
Henry Milch, M.D., Attending Orth. Surg., Hosp. for Joint Disease, N.Y.C.; Cons. Orth. Surg., Liberty Hosp.
2. Orthopedic Management of the Traumatic Hip.
J. J. Flanagan, M.D., Attending Orth. Surg., St. Michael's Hosp., Newark, N. J., and St. Mary's Hosp., Orange, N. J.
3. The Role of Physical Medicine in Rehabilitation of the Hip.
Arthur L. Watkins, M.D., Ass't. Clin. Prof. of Medicine, Harvard Medical School; Chief, Phys. Med., Massachusetts General Hospital, Boston; Director, Bay State Medical Rehabilitation Clinic.
4. Stability Factors in Rehabilitation of the Hip.
Allen S. Russek, M.D., Ass't. Prof. Phys. Med. and Rehab., New York University College of Medicine.

Discussion to be opened by Otto Eisert, M.D., Chief, Phys. Med. Rehab., VA Hosp., Brooklyn, N. Y.

4:45 P.M. — BUSINESS MEETING

5:15 P.M. — COCKTAILS — Essex House Hotel — Courtesy of Exhibitors.

7:00 P.M. — DINNER at Essex House Hotel.

8:00 P.M. — EVENING SESSION at Essex House Hotel.
1. Greetings from component Societies.
2. Organization and operation of the new Veterans Administration Research Hospital in Chicago.
Louis B. Newman, M.D., Chief, Phys. Med. Rehab. Service, VA Research Hospital, Chicago.
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The Effects of Ultrasound on Chromosomes, Nuclei and Other Structures of the Cells in Plant Tissues

JUSTUS F. LEHMANN, M.D.
J. F. HERRICK Ph.D.
and
FRANK H. KRUSEN, M.D.
Rochester, Minn.

Breaks, fusions, attenuation, stickiness, aberrations, dislocations, lysis and loss of chromaticity of chromosomes have been observed after exposure to ultrasound. The polarity and orientation of the chromosomes in the mitotic figures are frequently lost. The spindle figures of dividing nuclei are destroyed. Karyorrhexis, pyknosis, vacuolization of the nuclei and lysis of the nuclear membrane are found. Sometimes the cells, including the plasma, the cell membrane and all other structures, are completely disintegrated. These observations have been made in root tips of Allium, Narcissus, Vicia faba, Pisum, and in shoot tips of Helianthus[1-6]. It has been pointed out that these effects of ultrasound are not specific. Similar reactions can be observed after application of other agents such as roentgen rays, ultraviolet rays and mustard gas[2,5]. When exposed to ultrasound, animal cells and their structures have an appearance similar to those just described for plant tissues[7-9]. The further growth and development of plants and embryos has also been altered after application of ultrasound[8-14]. The genetic significance of these findings and the possibility of inducing mutations have been investigated[2,3,10,13,15,16]. The conditions under which the experiments were performed have varied widely. Ultrasonic frequencies from approximately 0.1 to 1.0 megacycle per second were used. The intensities varied from approximately 0.5 to 20 watts per square centimeter, and the time of exposure varied from approximately one second to ten minutes.

The manner in which the effects on the structures of the cell, which have been described, are produced by ultrasonic energy[17-20] is, as yet, not well understood. It still is open to question whether the reactions are caused by the heating effect of ultrasonic energy, by mechanical forces in the sound waves or by cavitation and related phenomena. The question whether cavitation (gaseous type or degassing) occurs in tissues, at ultrasonic intensities which are of the same order of magnitude as those used in therapy, is of great interest, because destructive forces (mechanical and thermal) result from cavitation. When consideration is limited to the ultrasonic effects on cells in tissues, the gaseous type of cavitation or degassing of some sort can be expected, in the first place, since any living tissue necessarily contains dissolved gas. Esche[21] was unable to demonstrate true cavitation ("hissing" cavitation) in animal tissues at intensities of the order of 500 watts per square centimeter. However, he thought that it was possible that degassing occurs at therapeutic intensities and frequencies. Harvey[22] has pointed out that degassing is produced more easily in biologic mediums than is to be expected from theoretical considerations. One of us (Lehmann)[23] studied degass-

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Abridgment of portion of thesis submitted by Dr. Lehmann to the Faculty of the Graduate School of the University of Minnesota in partial fulfillment of the requirements for the degree of Master of Science in Physical Medicine and Rehabilitation. Grateful acknowledgement is made by Dr. Lehmann to Dr. T. F. Hueter of the Massachusetts Institute of Technology, for many discussions which have helped considerably to clarify many problems.

ing in cell suspensions. He concluded that under therapeutic conditions cavitation and degassing are probably inhibited in the tissues by the high viscosity of the tissue fluid and by the great volume percentage of cells. On the other hand, two of us (Lehmann and Herrick)[23] demonstrated effects of cavitation in living mammals. The intensities used were higher than those recommended for therapy, to be sure; however, they were of the same order of magnitude. Reactions to cavitation were found, however, in blood vessels or in areas where gas nuclei were probably present (intestinal tract). The question whether cavitation (gaseous type, degassing) occurred in the tissues themselves could not be answered.

An attempt has been made in this study to obtain more information on those ultrasonic effects which produce the described changes of the cell structures. In particular, an attempt has been made to answer the question whether cavitation (gaseous type, degassing) occurs in the tissues themselves. Plant tissues were used in the study since they do not contain blood vessels in which cavitation can be produced more readily than in other areas[20,24].

Methods

Root tips of Allium cepa were exposed to ultrasonic waves of frequencies of 0.8 and 1 megacycle per second. Two commercially available ultrasonic generators,* each with a radiating surface of the applicator of 10 cm.^{2}, were used. The total output is stated in the tables. It was measured with a sound pressure balance. The pattern of the sound field was mapped with a probe. The root tips were inserted into the center of the beam where the intensity was approximately twice as high as the average intensity (total output divided by radiating surface). Freshly boiled water was used as the coupling medium. Gentle stirring provided an equal distribution of temperature in the constant (±0.01 C.) temperature water bath. Temperature measurements within the tissues were made with fine thermocouples. The time of exposure to ultrasound and heat was two minutes. Heat was applied by raising the temperature of the water bath. When pressure was employed during the experiments, it was released slowly (ten minutes) so that the roots were not damaged by the decompression (10 controls).

Immediately after an experiment was finished the root was fixed. After it had been embedded in paraffin, serial sections were made. The sections were stained with Feulgen's stain for nuclear material. Others were stained with Heidenhain's iron hematoxylin. The experimentally observed data were evaluated statistically. Differences were considered as significant if they were greater than those expected within a likelihood of 99.73 per cent.

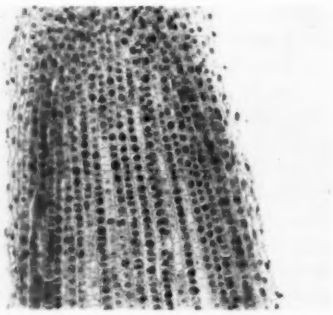

Fig. 1 — Control; intact cellular structures and mitotic figures (iron hematoxylin, Heidenhain; x125).

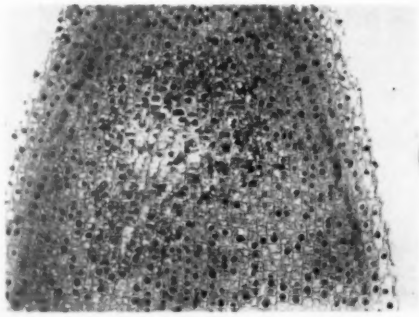

Fig. 2 — Spotty reaction with severest destruction in center (iron hematoxylin, Heidenhain; x125).

*Those of the Siemens Reiniger Werke and Ultrakust Company.

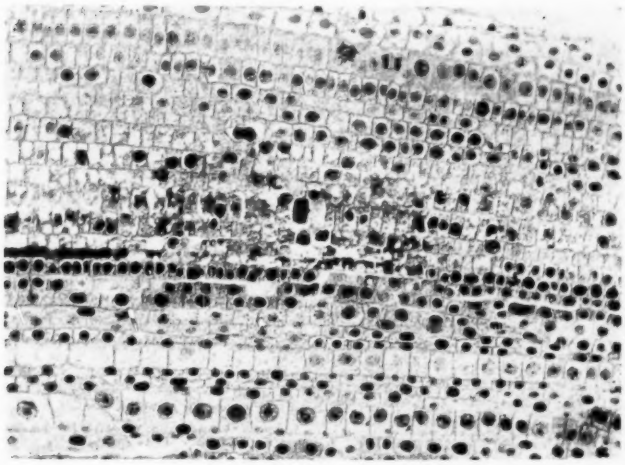

Fig. 3 — Spotty reaction with severest destruction in center surrounded by cells with normal structures showing some mitotic figures (iron hematoxylin, Heidenhain; x175).

Experiments

Two types of reactions were observed in our experiments with ultrasound. One reaction consisted of spheroidal or ellipsoidal zones of destruction of a diameter of approximately 10^{-2} to 10^{-3} cm. (fig. 1 and 2). The severest damage to the cells was always found in the center of these areas. Often all cellular structures such as cell walls, plasma and nuclei had disappeared in these regions, and a homogeneous mass of debris had been left. It was noted that the alterations of the cells became gradually less with increasing distance from the center (fig. 3). All the findings described previously[1-6] were observed in these areas (fig. 4 through 8). These spots were usually found in the lateral portions of the root cap (calyptra) and near the border be-

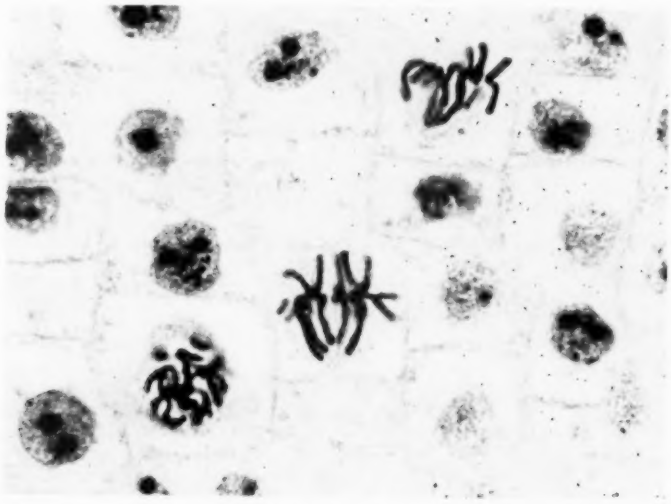

Fig. 4 — Control. Normal mitotic figures in various stages (iron hematoxylin, Heidenhain; x1,000).

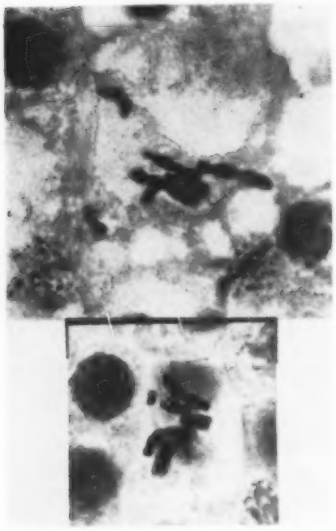

Fig. 5 — Ultrasound. Dislocation of chromosomes with swelling and breaks (iron hematoxylin, Heidenhain; x1,000).

tween cortex and stele. These observations, as to location, are in good agreement with those of Spencer[2] and Wachsmann[20].

The second type of reaction, a diffuse reaction, has been found to be uniformly distributed all over the roots exposed to ultrasound (fig. 9). The same sorts of cellular reactions as in the first type have been observed. However, shrinkage and vacuolization of plasma and nuclei were more dominant. The relative frequency of the occurrence of pyknosis and lysis of nuclei was greater in the uniform reaction than in the first described spotty areas of destruction. It was uncertain whether breaks and dislocations of chromosomes occurred commonly in this diffuse type of reaction.

The question arose concerning the manner in which these reactions had been produced by the ultrasonic energy. Therefore, their dependence on temperature was studied first (table 1). It was

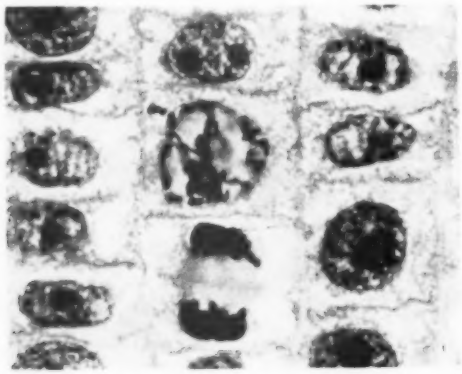

Fig. 6 — Control. Normal mitotic figures in various stages (iron hematoxylin, Heidenhain; x1,000).

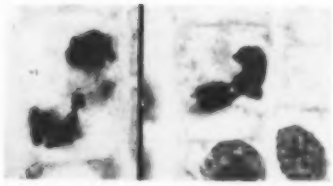

Fig. 7 — Ultrasound. Disturbed separation of the two sets of chromosomes with stickiness and dislocation (iron hematoxylin, Heidenhain; x1,000).

Table 1—Dependence of Reactions on Temperature*

Temperature of water bath, °C.	Number of roots	Reactions: Uniformly distributed over the root, per cent	Reactions: Spotty with severest destruction in center, per cent	Reactions: Of controls without ultrasound, per cent
10	55	0	69	0
30	28	14	75	0
39	30	84	77	0
41	20	100	70	0

*Ultrasonic output 33 watts, frequency 0.8 megacycle per second.

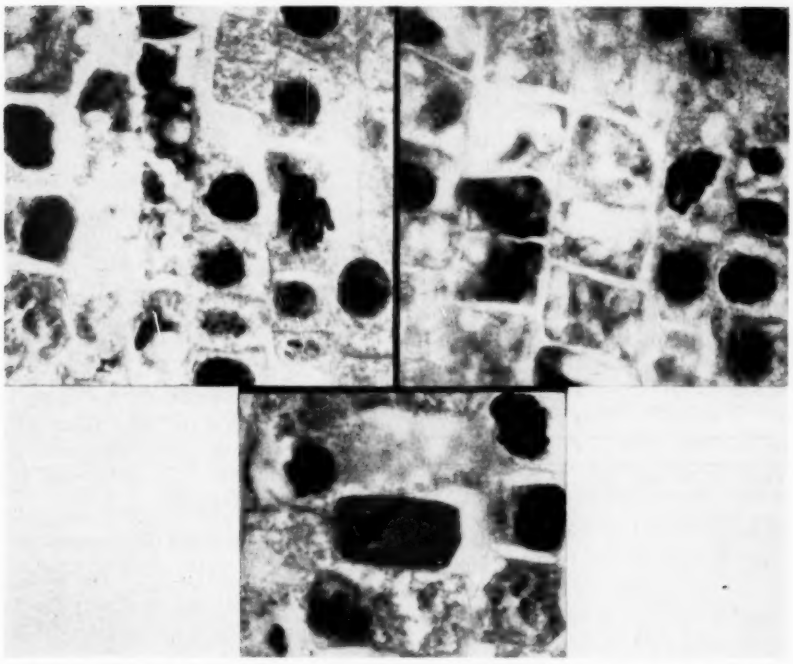

Fig. 8 — Ultrasound. Severe destruction of all parts of the cells (iron hematoxylin, Heidenhain; x1,000).

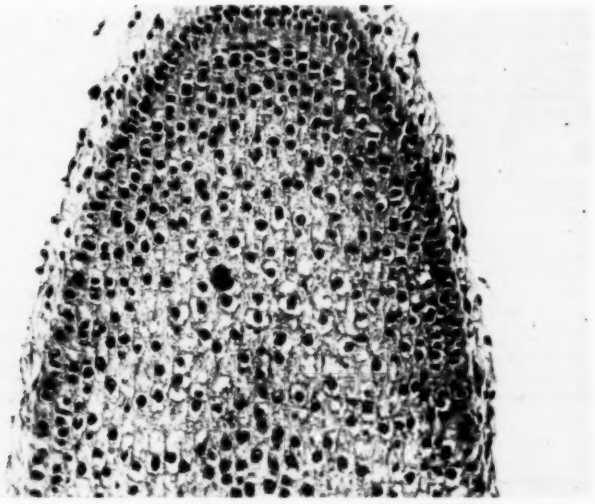

Fig. 9 — Reactions uniformly distributed over the root with shrinkage and vacuolization of nuclei and plasma (iron hematoxylin, Heidenhain; x125).

found that the spots of destruction within the roots occurred rather independently of increase of the temperature of the surrounding water bath. Secondly, it was observed that these spotty reactions occur only when the intensity of ultrasonic energy is raised above a certain threshold (table 2). Thirdly, this type of reaction

Table 2—Dependence of Reactions on Ultrasonic Intensity*

Ultrasonic output, watts	Number of roots	Reactions	
		Uniformly distributed over the root, per cent	Spotty with severest destruction in center, per cent
10	55	0	0
20	55	0	34
30	55	0	69

*Temperature of water bath 10 C. Ultrasonic frequency 0.8 megacycle per second.

could be prevented by the application of pressure during exposure to ultrasound (table 3). However, the percentage of reactions remained the same whether the roots were exposed in water or were embedded in agar gel. In other words, the reactions did not depend on the viscosity of the surrounding medium. Those reactions which were uniformly distributed all over the roots were dependent on temperature (table 4). They could be prevented by cooling.

Table 3—Dependence of Reactions on Pressure and on Viscosity of Surrounding Medium*

Experimental conditions	Number of roots	Reactions spotty with severest destruction in center, per cent
6.7 atmospheres, exposure in water	28	0
1 atmosphere, exposure in water	56	61
1 atmosphere, exposure in agar gel	23	56

*Ultrasonic output 31 watts, frequency 1 megacycle per second, temperature of water and gel 18 C.

Ultrasonic energy could be replaced by heat without changing the percentage of reactions of this type, if only the temperature of the water bath was raised enough to maintain the same tissue temperature as was observed during application of ultrasound of higher intensity (table 4). Furthermore, this type of reaction after exposure to ultrasound could be reproduced quantitatively by application of heat. The heat was applied by raising the temperature of the water in such a fashion that the same tissue temperature was obtained as was produced during irradiation with ultrasound (33 and 10 watts) (table 4).

Conclusions and Comment

The following results of the experiments performed suggested that the localized spotty reactions, having the severest destruction in the center, apparently were not entirely dependent on temperature and could not be prevented by cooling. The degree of damage in these areas could not be reproduced by raising the temperature even by 30 C. (45 roots). However, such damage was prevented completely by application of pressure. These findings suggested that these reactions were caused by cavitation (gaseous type, degassing) occurring in the center of the area of destruction. This assumption has been confirmed by an observation recently published by Selman[6]. He found that the cell destruction observed in smears of the root tips was prevented by application of pressure.

Table 4—Reproduction of Ultrasonic Reactions by Heat*

	Number of roots	Temperature, ° C.		Reactions		
		Of water bath	Of tissues	Uniformly distributed over the root, per cent	Spotty with severest destruction in center, per cent	Of controls without ultrasound, per cent
Ultrasound 33 watts	20	11	18.5 ±0.4**	100	70	0
Ultrasound 10 watts	21	16.9	18.5 ±0.4**	100	0	81 (uniformly distributed over the root)
Heat	15	18.5	18.5	98	0	—

*Ultrasonic frequency 0.8 megacycle per second.
**Standard error of the mean.

But, as a result of the technic which he employed, he was unable to conclude where the cavitation occurred. He assumed that it occurred in the water. However, the location of the zones of damage in the root, as observed in our experiments, suggests that the cavitation bubbles (gaseous type, degassing) were created in the tissues. The investigations of Goldman and Lepeschkin[19] have demonstrated that the effects of cavitation subside very quickly with increasing distance (approximately 0.1 mm.). Therefore it is unlikely that the severest damage would be found within the root if cavitation occurred in the surrounding water. The experiments in which the roots were embedded in agar gel confirm the assumption that the cavitation bubbles (gaseous type, degassing) were found inside the tissues of the root, since cavitation is inhibited in gel[21]. Our experiments do not contribute to the solution of the problem whether cavitation (gaseous type, degassing) is produced in the cells themselves or in the intercellular spaces. Finally, we were unable to decide whether the observed biologic effects were brought about by mechanical, thermal or other reactions resulting from cavitation (gaseous type, degassing).

In contrast with the behavior of the spotty reactions, those effects which were diffusely spread over the roots were caused mainly by the heating effect of ultrasonic energy. These reactions occurred only above a certain level of temperature. They were prevented by cooling. They could be reproduced quantitatively so far as the number of reactions was concerned by heating the tissues to the same temperature as that measured in the roots during exposure to ultrasound. However, the question whether other nonthermal effects of ultrasound were involved in addition could not be answered by our experiments. It was only possible to determine whether or not there was a diffuse reaction in the root tip. It was impossible to measure quantitatively the degree of the alterations of the cell structure. It appeared that the effects of ultrasound were somewhat more pronounced than those of heat of a corresponding degree. The behavior of these diffusely spread reactions is therefore similar to many other biologic effects of ultrasound as described previously[23,25].

Summary

An attempt has been made to explain the effects of ultrasound on chromosomes, nuclei and other cell structures as resulting partly from the heating effect of ultrasonic energy and partly from the occurrence of cavitation (gaseous type, degassing). The cavitation bubbles were formed in the plant tissues when the ultrasonic intensities, employed experimentally, were of the same order as those used in therapy. However, the intensities required to produce these cavitation effects experimentally, with stationary sound applicators, were somewhat but not much higher than those recommended for ultrasonic therapy. Therefore, one should be aware of such undesirable effects in therapy and in clinical practice one should not deviate too much from recommended and established technics and doses.

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IMPORTANT ANNOUNCEMENT

AMERICAN BOARD OF PHYSICAL MEDICINE AND REHABILITATION

The next examinations for the American Board of Physical Medicine and Rehabilitation will be held in Washington, D.C., September 5 and 6, 1954. The final date for filing applications is March 31, 1954. Applications for eligibility to the examinations should be mailed to the Secretary, Dr. Earl C. Elkins, 30 N. Michigan Ave., Chicago 2, Ill.

Shoulder Movements in Health and Disease

GUY H. FISK, M.D.
and
GARNET COLWELL, M.D.
Canada

A casual remark to one of us by Cranfield[1] that he thought shoulder movements varied with the musculature of the individual has prompted this paper. A previous paper by the senior author[2] dealt with the normal shoulder movements in young and healthy women. It was assumed at that time that these would be typical of all adults and that such a series was adequate to determine the common shoulder movements.

Soon after this paper was published, Inman's[3] masterly article on the shoulder appeared; but even this does not answer the question relative to whether variations in musculature cause variation in shoulder movements. In view of the doubt raised by the foregoing remark, for which no answer can be found in the literature, it was thought worthwhile to investigate a further series of normal shoulders in people of varying musculature and also some abnormal shoulders such as are commonly seen in the outpatient clinic of the Department of Physical Medicine and Rehabilitation of the Montreal (Canada) General Hospital. Patients with heavy muscles, such as dock laborers, as well as those doing sedentary work, were investigated to see what bearing if any this muscle development had on shoulder movements. Both male and female patients were included in the study. The normal shoulders studied included nine males and four females of the sedentary type and nine males and three females of the muscular type.

Serial x-rays of the shoulder were taken in six different positions on all cases, and in those where any doubt arose further x-rays and fluoroscopic observations were performed. Each x-ray plate was taken so that it included the upper third of the humerus, the entire scapula and clavicle, the lower cervical and upper thoracic vertebrae. All of the positions will be described from the radiographs as though the bones were two dimensional.

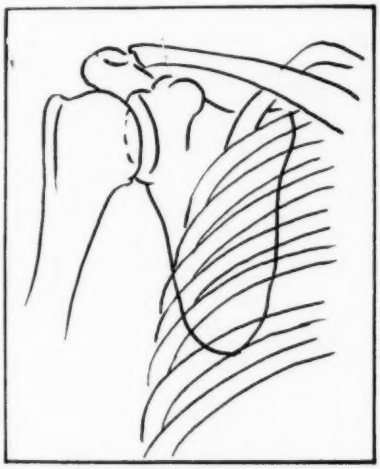

Fig. 1 — Full external rotation, arm at side.

Position One

This is full external rotation with the arm at the side (fig. 1). To attain this, the forearm was bent to a right angle and the arm rotated externally as far as possible with the elbow touching the chest wall. In this position the humerus is in full external rotation with the lesser tuberosity forming the lateral border. In the radiograph, the hemispherical head of the humerus rests on the shaft at the anatomical neck at an angle of forty-five degrees facing supero-medially. Thus the hemisphere may be divided into thirds—upper, middle, and lower—as it extends

From the Department of Physical Medicine and Rehabilitation of the Montreal (Canada) General Hospital.

This work was completed under grants from the National Research Council of Canada and The Charles E. Frosst Co., Ltd.

down from the greater tuberosity by the lesser tuberosity to the shaft. This is well seen in the antero-posterior radiograph of position one, where only the lower third of the hemisphere articulates with the glenoid of the scapula. The vertebral border of the scapula is directly vertical with the glenoid facing directly laterally. The clavicle is in its classical position with the superior and inferior surfaces facing directly upwards and downwards.

Fig. 2 — Full internal rotation, arm at side.

Position Two

This is full internal rotation and is obtained by flexing the forearm to a right angle and placing it behind the back. The arm, meanwhile, is kept close to the side (fig. 2). The medial border of the upper portion of the humerus is formed by the medial border of the bicipital groove in this position. The scapula has rotated about a vertical axis so that the coracoid process is almost antero-posterior and the glenoid process faces antero-laterally. The scapula as a whole has glided forward and laterally on the chest wall, so that the vertebral border is now over twice the distance from the thoracic spine. At the same time the attachment of the acromion to the clavicle has rotated the clavicle on its long axis so that the superior surface is now tipped forwards.

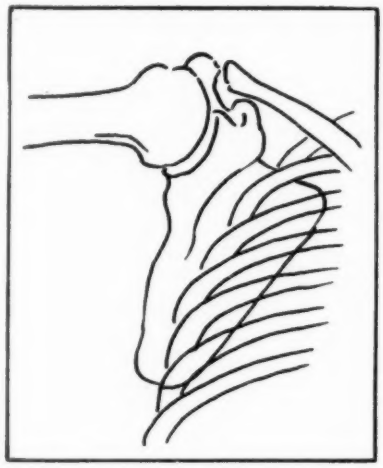

Fig. 3 — External rotation in abduction.

Position Three

The arm is abducted or raised sideways to ninety degrees. The forearm is flexed to a right angle at the elbow and the humerus rotated on its long axis as far as possible so that its anterior surface faces upwards (fig. 3). This is full external rotation with the arm in the abducted position. The middle third of the hemispherical head of the humerus is now in contact with the glenoid. The glenoid now faces supero-laterally at an angle of forty-five degrees with the vertical. The inferior angle of the scapula is at the lateral border of the rib cage. There is no true vertical movement of the scapula as a whole. The clavicle has angled upwards at the sternoclavicular joint to form a twenty-five degree angle with the horizontal. At the same time the superior surface of the clavicle has rotated slightly posteriorly.

Position Four

The arm is abducted to a right angle as in position three, but the humerus is rotated on its long axis so that the anterior surface now faces downwards or inferiorly (fig. 4). This is full internal rotation with the arm in the abducted position. The lesser tuberosity of the humerus passes from the superior to the inferior position while the scapula rotates about an axis running from the center

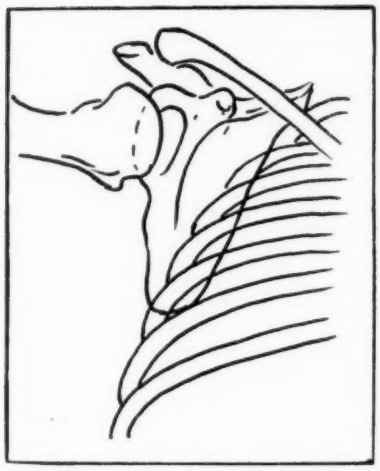

Fig. 4 — Internal rotation in abduction.

of the glenoid cavity to the midpoint of the vertebral border, bringing the superior border forward and the inferior angle away from the thoracic cage. The clavicle rotates on its long axis so that the superior border now faces anteriorly.

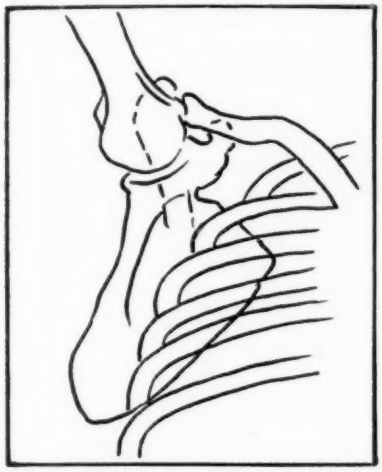

Fig. 5 — External rotation in elevation.

Position Five

The arm is elevated above the head vertically (fig. 5). The elbow is flexed to a right angle and the forearm and arm rotated so that the hand points as far posteriorly as possible. This is full external rotation, with the arm elevated, and can be reached by simple elevation of position one through almost 180 degrees. The same position is also reached in the movement of flexion of the shoulder from position one. Here, of course, the arm is brought forwards and upwards. The scapula is rotated about an antero-posterior axis and the glenoid faces laterally and upwards now forming an angle of forty degrees with the vertical. At the same time, the scapula has rotated on a coronal axis so that the inferior surface of the acromion faces forward directly posterior to the head of the humerus. The upper third of the hemisphere of the humeral head now articulates with the glenoid. The clavicle continues to rotate to a forty-five degree angle with the horizontal on the sternum.

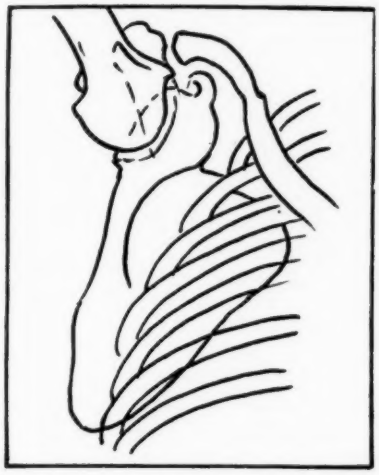

Fig. 6 — Internal rotation in elevation.

Position Six

This is similar to position five except that the arm and forearm have been internally rotated so that the hand and forearm are pointing as far forward as possible. As can be seen from figure 6, there is only a very slight movement at this position, not exceeding, in the most supple person, ten degrees of rotation after which the humerus is forced down towards the horizontal by further rotation. This ten degrees of rotation occurs by the sliding of the scapula on the chest wall.

From these observations it is obvious that the movements of the shoulder are as follows: In elevation of the arm in the coronal plane or the sagittal plane there is a well co-ordinated scapulo-humeral rhythm. There is movement at the scapulo-humeral, scapulo-thoracic, acromio-clavicular and sterno-clavicular joints. These movements occur during all phases of shoulder action, and interference with any one of them limits the movement markedly. In abduction of the arm in a coronal plane the scapula moves continuously in rhythm with the humerus from start to finish of the movement. There is no specific portion of the movement that can be attributed to either the scapulo-humeral or the scapulo-thoracic joint in the normal person. As abduction proceeds from position one to position four there is movement at the scapulo-humeral joint. The inferior scapula angle rotates laterally and the superior angle rotates medially. At the same time, the inferior angle of the scapula tilts forwards and the superior border tilts posteriorly or backwards. The glenoid surface, which faces laterally at the beginning of abduction, moves so that it faces superiorly on completion of the movement. The scapula as a whole moves superiorly for a short distance in full elevation.

During abduction and elevation there is constant movement of the clavicle and constant movement at the sterno-clavicular and acromio-clavicular joints. As the movements proceed there is rotation of the distal end superiorly and also movement around its long axis so that the anterior surface tends to rotate superiorly, as indicated by Inman. On abduction of the arm the foregoing movements occur in reverse.

In the movement of full external rotation to full internal rotation of the shaft of the humerus, the head of the humerus rotates through ninety degrees on the glenoid. The glenoid itself also rotates through another seventy degrees. This is due to movement at the scapulo-thoracic surface. The scapula in this movement rotates on a perpendicular axis (long axis) as well as on a horizontal axis (transverse axis). For instance, on external rotation the glenoid may begin by facing antero-laterally and end by facing laterally. The inferior angle of the scapula tilts forward and the superior border tilts posteriorly during this movement. The clavicle rotates superiorly in the long axis during external rotation of the shoulder so that the anterior border rotates superiorly. The converse movements of the scapula and clavicle were seen to take place in the internal rotation of the humerus. In full elevation there is little if any rotation possible at the scapulo-humeral joint, although there is some slight gliding of the scapula on the thorax.

In normal people the humerus can be elevated so that the long axis of the humerus is in line with the spine of the scapula. The range of the scapular movement on the thorax in all directions is greater in females than in males. This would explain the propensity of women's dresses and other articles of clothing to fasten on the back. No mere man could ever get his hands far enough back to button up a vest.

The development of the muscles and the patient's physique had no bearing on either range of movement or the component details of movement at the shoulder. Coal heavers and sedentary office workers showed the same components in all movements. The same applied to women except for the slight increase in range in all movements. Even a window washer, whose work entails nothing but arm and shoulder movements, differed in no way from the others.

Electromyography was undertaken in the shoulder muscles of these patients. The muscles tested were the supraspinatus, trapezius, deltoid, infraspinatus, biceps, teres major and minor, pectoralis major, rhomboids, serratus magnus and latissimus dorsi. This was done to provide a basis for observations on diseased shoulders and to corroborate Inman's studies. Our conclusions agree with those of Inman and several points are worth reiterating again, as many surgeons and anatomists still have not realized the importance of these observations.

The shoulder muscles act in groups. Antagonists are completely inhibited

when the protagonists act. For example, the pectoralis major shows complete inhibition of action potentials when the deltoid contracts in elevation of the shoulder. The greatest action potentials appear during the movements of the muscles as protagonists. As synergists the action potentials were smaller. This applied to all the muscles tested.

The muscles of the shoulder can be divided into three groups which are active during the following functions: Group 1—The deltoid supraspinatus, and the upper trapezius, which are active as abductors and elevators of the arm; Group 2—The pectoralis major, rhomboids, teres major, lower trapezius and latissimus dorsi which act during adduction, and Group 3—The infraspinatus, teres minor, subscapularis, teres major and pectoralis major, which act as rotators.

Inman's statement is herewith emphasized that the deltoid and supraspinatus both act throughout the whole of abduction and elevation. No evidence could be seen of the so-called initiating movements of the supraspinatus. When the shoulder is put at rest both in the standing and lying positions, no evidence of continuous action potential was found in any muscle. All muscles could be put at complete rest showing that no muscle action is required to maintain the normal position of the shoulder. Maintenance of position must therefore be a function of the ligaments and gravity.

The action potentials of the muscles remained almost constant from patient to patient. Muscular individuals showed no greater voltage in their action potentials than the sedentary persons. The average potential was 0.8 millevolts, varying from 1.6 millevolts to 0.2 millevolts.

On the basis of the foregoing observations six different types of shoulder disease or injury were studied. These were periarthritis of the shoulder, five males and two females; fracture of the surgical neck of the humerus, one male and one female; rheumatoid arthritis of the shoulders, two males; absent clavicle (surgical removal for tumor), one male; dislocation of the shoulder, two males, and deltoid paralysis, three males.

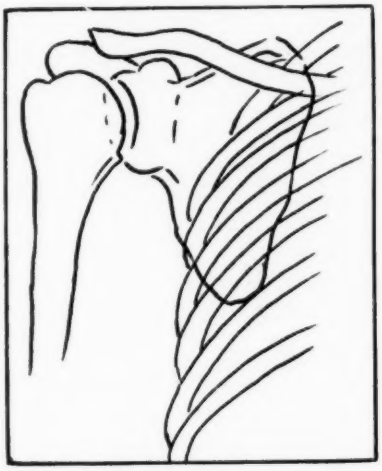

Fig. 7 — Periarthritic shoulder, at rest.

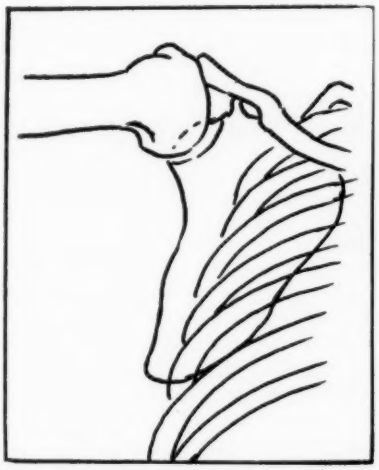

Fig. 8 — Periarthritic shoulder, full abduction to limit of range.

Cases of periarthritis of the shoulder, bursitis or so called frozen shoulder, both with and without calcification, were studied. In this disease there is limitation of movement at the shoulder. This limitation is at the scapulo-humeral joint (fig. 7 and 8). It is greatest in rotation. In elevation and abduction the limitation is in movement of the upper third

of hemisphere of the head of the humerus on the glenoid. An attempt is made to compensate for this by extra movement of the scapula. This gradually develops in some patients and often causes pain over the inferior angle of the scapula where the latissimus dorsi is attached. This attachment is strained by the increasing scapula range. No evidence was seen in any patient of muscle spasm around the shoulder. All the muscles relaxed fully, and action potentials could be completely abolished. The action potentials in these muscles varied in no way from those of normal muscles, so it is evident that the theory of muscle spasm causing the pain of this condition is baseless. No evidence could be found of deltoid or supraspinatus muscle spasm to explain the deltoid insertion pain.

We also noted that there was no special type of personality as postulated by Coventry[4]. The types seen varied from the young and vigorous school girl to the apoplectic and tired business man. The truck driver with his beligerent outlook and the more easily moulded student suffered from the same disease without any apparent similarity of personality or habits. Care was taken to eliminate any cases studied in which radiculitis or cervical osteoarthritis was evident.

Fractures of the surgical neck of the humerus exhibit a phenomenon similar to that of the frozen shoulder. The limitation of movement is at the scapulo-humeral joint and the patient attempts to compensate for this in the same way as he does for a frozen shoulder, by increasing the mobility of the scapula. As this increased mobility is very slight, true increase in range has to await the return of greater scapulo-humeral mobility. No muscle spasm was detected in any of these cases and all of the muscles acted with normal potentials. Uncomplicated dislocations of the shoulder after reduction showed normal action potentials of all the muscles and full range action of the muscles in a normal manner. In rheumatoid arthritis it was again noted that the limitation of the movement was at the scapulo-humeral joint. It was most marked in abduction. In this disease the action potentials of the muscles remained normal even though movement was limited by pain. Cases of deltoid paralysis showed all other muscles acting normally with normal action potentials. The supraspinatus attempts to perform the work of the deltoid but cannot be developed sufficiently to do this, even with prolonged exercising against increasing resistance. Except for the absence of the deltoid action the details of the joint movements are exactly the same as those of the normal shoulders when active movement is attempted.

A case of absent clavicle, removed subperiosteally six years previously for a fibrosarcoma, was studied. Partial regeneration of the clavicle had occurred but there was still no complete clavicle present. In this patient full internal rotation brought the scapula into an anteroposterior position. It rotated through ninety degrees on a vertical axis by sliding round the chest wall. In abduction the scapula falls medially owing to the lack of clavicular support. Elevation is slightly greater than average, the face of the glenoid making a seventy degree angle with the vertical.

From these observations it is believed that the following points should be borne in mind in the treatment of shoulder conditions. First, that the presence or absence of the supraspinatus is of little or no importance in the range of movement. All active movements can be accomplished in its absence, although the movements may be slightly weaker. The deltoid will compensate satisfactorily for the absent supraspinatus. Secondly, the deltoid is an essential muscle to the shoulder. Without it satisfactory abduction is impossible. Thirdly, in frozen shoulder whether due to trauma or to disease, the problem is to mobilize the scapulo-humeral joint. This joint is an essential and cannot be compensated for by extra mobility of the scapula on the chest wall.

Summary

This paper is an attempt to determine from a study of the shoulders of forty-two persons, the relative importance of the scapulo-humeral and the scapulo-

thoraco movements in shoulder function in health and disease. It has been shown that normal shoulder joint activity requires both these movements, and that one movement does not substitute for the other. In disease, the joint between the humerus and scapula is the one commonly affected and treatment must be directed to mobilizing this joint.

Acknowledgement — We gratefully acknowledge the assistance given to us by the Departments of Radiology and Photography of the Montreal (Canada) General Hospital.

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AMERICAN CONGRESS OF PHYSICAL MEDICINE AND REHABILITATION

meeting of the

Rocky Mountain Section

Sabin Auditorium, University of Colorado School of Medicine, Denver

Saturday, April 10, 1954

SCIENTIFIC PROGRAM

"Causalgia and the Occurrence of Pain in Peripheral Nerve Injury"
James Stephens, M.D.

"Surgical Management of Injuries to Peripheral Nerves"
Keasley Welsh, M.D.

"Physical Agents in Diagnosis and Treatment of Peripheral Nerve Injury"
Harold Dinken, M.D.

ALL PHYSICIANS ARE URGED TO ATTEND

The Cobalt Chloride Sweating Test: A Clinical Evaluation and Review of Complications

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WASHINGTON, D.C.

JOHN H. KUITERT, LT. COL., USA (MC)
FT. SAM HOUSTON, TEXAS

and

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NEW YORK

The absence of sweating in a given area of the body is now well recognized as one indication of alteration of the peripheral nerve supply to that area.[1,2] The importance of this fact has led to the development of many clinical tests for the determination of skin sweating. It is the purpose of this paper to describe in detail a technic already developed and to point out precautions in its use.

Tinel[3] suggested the use of litmus paper in testing for sweating, noting that the slight acidity of normal perspiration would change blue litmus to red. This probably remains the simplest chemical test available, but is obviously too time consuming for use in the careful investigation of large areas. Minor's[4] original description of the starch-iodine test presented the first of the more complicated procedures depending on the interaction of two or more substances. This was followed by the cobalt chloride test[5], the chinizarin test[6], and the ferric chloride test[7]. Many modifications of these tests exist, particularly the starch-iodine reaction[8]. Recently the use of illuminated magnification for the direct observation of the drops of sweat has been suggested[9]. The variations in skin resistance over sweating and non-sweating areas when small electrical currents are applied have been utilized as neuro-dermometry[10].

Except for the latter two methods, and the cobalt chloride reaction as described by Roth[5], these tests are noted for the variety of materials used, and for the objectionable esthetic result of the mixture produced, both to the examiner and to the patient. The removal of the materials from the skin, following the test, is usually difficult and frequently requires the use of an additional chemical agent, as well as the vigorous mechanical action of soap, water, and a strong arm.

When evaluating a large series of peripheral nerve injuries or other problems for which the sweating test has proved helpful, the authors feel that a test simple to administer over large areas, simple to eradicate without inconveniencing the patient, and one which is easily interpreted and recorded should be employed. This review was set up to select a test which would meet these criteria. It was felt that after careful consideration of the many tests available, the cobalt chloride technic readily fulfilled the first two requirements, but that more definite evaluation of the third was necessary.

The literature presents no indication that any of these tests, which depend upon the application of a chemical agent to the skin, can provoke unexpected responses such as skin irritation. This did occur during our study of the cobalt chloride test and will be discussed in some detail.

Equipment

1. Solution of 25% cobalt chloride in 95% alcohol.

Read at the Thirty-first Annual Session of the American Congress of Physical Medicine and Rehabilitation, Chicago, September 3, 1953.

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2. Radiant heat cabinet, body type, with glass doors.
3. Two small stools, one outside cabinet, one inside cabinet.
4. Two large sheets of paper, one outside cabinet, one inside cabinet.
5. Bath towels, 6 to 10 in number.
6. Anatomical charts to record the sweating pattern.
7. A red and blue pencil.
8. Clean paint brush, one inch in width.
9. One medicine glass, or other small receptacle sufficiently large to receive the paint brush.
10. Tumbler of water, 240 cc.
11. Wash cloth, basin of water, and soap.
12. Washable or disposable loin cloth, and if subject is a woman, a brassiere.

Technic

The equipment is assembled, and the radiant heat cabinet pre-heated from 130 to 140 F. A towel is placed over the stool in the cabinet to protect the patient from unusual heating, and paper is spread over the floor of the cabinet as a protection against possible dripping of the dye-stained perspiration. A second sheet of paper is spread immediately outside the cabinet to protect the floor while the cobalt chloride is being applied to the patient. The entire procedure is carefully explained to the patient, who is asked to remove all clothing, put on the loin cloth and/or the protective breast covering.

The areas to be examined are then painted with the cobalt chloride solution, using the brush to apply one-inch stripes at approximately one-inch intervals (fig. 1). If an extremity is to be examined, the normal side, which will serve as a control, is always striped as well as the area to be tested. The neck and shoulder girdle are included with the upper extremity. The inguinal region is included with the lower extremity. The entire trunk is tested if there is any area in question on the chest, abdomen, or back. The hands and feet, including the plantar surfaces, are always painted in their entirety when the extremities are tested.

Fig. 1 — Method of application of cobalt chloride.

Following application of the cobalt chloride, the patient is seated in the cabinet. He is given 500 cc. of water at room temperature to drink, and the doors and neck piece of the cabinet are closed. A towel is placed about the neck to prevent heat loss and the patient is observed constantly through the glass doors for evidence of perspiration. There will be a gradual transition of the color of the cobalt chloride from blue to pink and ultimately to red as the degree of sweating increases. The average person has been found to achieve a maximum degree of perspiration within five to ten minutes. By noting the color changes as well as the general reaction of the patient, the maximum sweating stages can be determined. The sweating pattern is recorded immediately on the topographic forms provided, and the patient is removed from the heat cabinet for this purpose. The areas tested are then washed with soap and water, and a full body bath or shower is recommended on the return of the patient to the ward. The average time for the complete test, from initial application of the dye to

removal, usually requires from twenty to twenty-five minutes.

The dark-skinned or Negroid patient presents a somewhat difficult problem in the interpretation of the sweat pattern, for the change of the cobalt chloride color to shades of red is often not readily evident. It has been found, however, that as soon as the patient has been removed from the cabinet and exposed to the air, the areas which have perspired will assume a frosted or snowy appearance for a short time, which permits ready identification.

It is essential that the dye is not permitted to enter any open areas of broken skin. Such areas must be carefully protected and avoided during the application of the cobalt chloride, and the surrounding areas should be very lightly striped, so that the dye will not run into the open parts.

Discussion

During the three year period from January 1, 1950, to December 31, 1952, the Physical Medicine Service at Walter Reed Army Hospital examined 300 patients by means of the cobalt chloride sweating test. The majority of these patients represented peripheral nerve injuries, and the test was confined to the upper or lower extremities. The remaining patients received combinations of trunk and extremity testing, and the major disease classifications included herniated nucleus pulposis, transverse myelitis, syringomyelia, and hysteria. Selected patients who had received vascular injuries were studied in an effort to evaluate any associated sympathetic nervous system trauma, and several postlumbar or dorsal sympathectomised patients were examined in order to evaluate the extent of the operative procedure.

The cobalt chloride sweating test was considered by the physiatrists, neurologists, neurosurgeons, and vascular surgeons responsible for the management of the subjects, sufficiently accurate in the outlining of sweating patterns to be of aid in the diagnosis of 271 of the 300 patients studied. This was not simply a clinical opinion, but was verified by other evaluations, including electromyography, electro-diagnostic tests, and surgical findings. The remaining twenty-nine patients, in whom the test was not considered accurate, presented complicating factors, the primary one being hyperkeratosis. This problem has been well recognized by others doing various sweating tests. Other patients were unable to tolerate the heat cabinet and were removed before a maximum sweating response had developed. Several patients suffered from multiple soft tissue wounds of the extremities, and there was insufficient body area available to permit application of the dye to large enough regions for evaluation of a definite pattern.

While the authors feel that sufficient proof has been accumulated to indicate that the cobalt chloride sweating test meets the criteria which they established, a complication has developed in several of the patients tested, which must be considered by all who choose to utilize this means of sweat testing. This reaction is considered to be a typical contact dermatitis provoked by the cobalt chloride. It occurred in seven of the patients tested. All of these were in the group of 271 in whom the test was considered a useful aid in diagnosis. The reaction usually begins as a marked pruritus over the areas striped about three to five minutes after the application of the cobalt chloride. Wheal formations then appear over the same areas. These rapidly coalesce to form pruritic, indurated, elevated stripes which correspond exactly to the areas where the cobalt chloride has been applied. With the exception of the case to be reported in detail, each patient perspired within the usual time and, following removal of the dye and administration of an oral antihistaminic agent, relief from the intense pruritus was noted within fifteen to twenty minutes. The urticarial areas generally subsided with no evidence of residuals within three to four hours after onset. The patients were maintained on

oral antihistaminic agents for two days after the reaction.

A single exception to the course of this reaction occurred in a patient whose sweating time was slightly longer than usual and who was maintained in the heat cabinet for a total of fourteen minutes. While in the cabinet no specific complaints were noted, but as the cobalt chloride was being washed from his skin, the onset of pruritus involving the testing sites on the trunk and lower extremities became evident. As soon as the material was completely removed from the skin, small wheals appeared and antihistaminic therapy was instituted. The reaction progressed as previously described; but, in spite of the usual treatment, the areas of urticaria persisted. Within six to eight hours, multiple areas of capillary dilitation were also evident within the indurated, raised areas of previous striping. By the end of twenty-four hours, multiple subcutaneous hemorrhages were evident, although the pruritus and swelling had subsided (fig. 2 and 3). Residual pigmentation of the areas involved—the trunk and thighs—gradually subsided over the next four months but was still evident upon discharge from the hospital approximately seventeen weeks after the test. Hospitalization was not prolonged by this reaction but by the natural course of the primary disease. The patient felt no ill effects from the test after the first twenty-four hours, but he was the source of much comment from other patients on his ward because of his "zebra-like" appearance.

The unusual reactions described are the subject of further evaluation by the Dermatology Section of this hospital where tests have been conducted to determine the sensitivity of a large group to cobalt chloride, in varying dilutions. These tests, thus far, are inconclusive. The untoward reactions apparently represent a true contact dermatitis. The most severe reaction may have been precipitated by the length of time the cobalt chloride solution was allowed to remain in contact with the skin of a sensitive individual, since in all other reactions the patients perspired within the usual time and the material was immediately washed away.

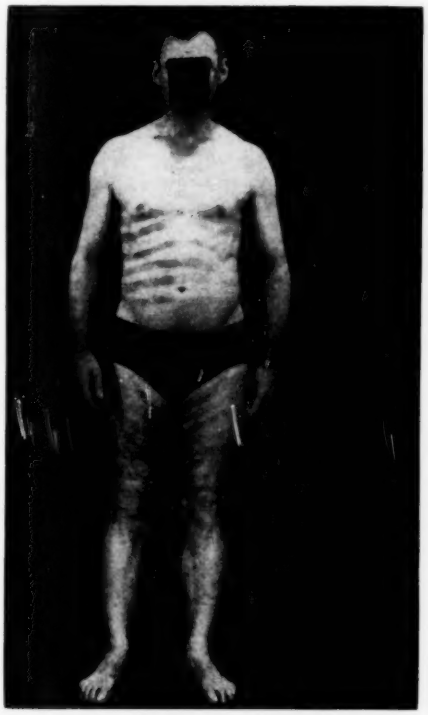

Fig. 2 — Residual pigmentation — anterior trunk and extremities.

Further study of the cobalt chloride test is being continued in an effort to evaluate more fully this type of reaction as well as the means of preventing or halting it if it does develop. At present, the authors feel that any patient who complains of itching at the site of the cobalt application should be removed from the cabinet, immediately washed, and given antihistaminic agents in an effort to halt the progression of the reaction. Definite pruritus should be carefully differentiated from a response which many patients have noted, and one which is a natural reaction and not indicative of more serious consequences. This is a transient smarting or burning sensation as sweating begins and is due to the presence of the 95 per cent alcohol solution on the skin. The seven

Fig. 3 — Residual pigmentation — posterior trunk and extremities.

patients who reacted adversely showed no untoward skin response to the application of the alcohol alone, which apparently defined cobalt chloride as the primary offender.

It is apparent that while the cobalt chloride test has been established as being simple to administer and accurate and easy to remove, it is also potentially damaging to the skin. Its value as a simple yet accurate test must be weighed against its possible complications. Its use will be continued by the authors, but the warning signs, which we feel are indicative of an untoward response, will be carefully observed while further studies are carried out. It cannot, at this time, be regarded as being a completely safe test for general use when carried out as described. Medico-legal aspects of complications are also apparent and should be considered.

Summary

A technic of administering the cobalt chloride sweating test is presented in detail.

The value of this particular sweating test as a diagnostic aid in the evaluation of selected injuries and diseases is established.

Untoward reactions to the cobalt chloride sweating tests are discussed, together with the presentation of one case of severe and prolonged response.

Conclusions

The cobalt chloride sweating test is considered to be a simple yet accurate means of evaluating the sweating pattern over large areas of the body and offers a graphic result which may be readily charted.

The advantages of this test may be outweighed by the potential dangers of the skin reactions which have occurred when the test has been administered as described. The reactions may be minimized by early recognition and prompt institution of treatment. No means have as yet been devised to predict these potential cutaneous reactions, and until these are available, this technic of sweat testing cannot be recommended for general use.

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Discussion

Dr. K. Harpuder (New York City): The authors are to be congratulated on their careful and thorough study. The diagnostic value and limitations of sweating tests are well established. The choice of method for the test is a matter of convenience and not of essential difference in applicability or clinical significance. In many instances, measurement of skin resistance may be preferable because it can be carried out under normal environmental conditions. It also avoids staining of the skin. In cases of skin sensitivity to iodine or as reported, to cobalt, it will be safest to measure skin resistance. However, if the quite simple equipment is not available, one of the dye methods may have to be employed. Careful and detailed reports like the one presented by Dr. Vultee and his associates will help in successful application of the sweating test.

MEDICAL NEWS

Members are invited to send to this office items of news of general interest, for example, those relating to society activities, new hospitals, education, etc. Programs should be received at least six weeks before the date of meeting.

PERSONALS

Francis X. Sweeney, medical director of the Multiple Sclerosis Center in Detroit, will succeed the late Hinton Jonez as director of the Tacoma, Wash., MS Clinic. Dr. Jonez, prior to his death, had selected Dr. Sweeney as his successor. — **Ellen Neall Duvall,** Richmond, Va., has been named recipient of a Guggenheim Fellowship Award. Dr. Duvall will do research in kinesiology. — **Gerald P. Lawrence** has been transferred to the Veterans Hospital at Miles City, Montana. Dr. Lawrence comes from the Domiciliary Centers at Wood, Wisconsin and Clinton, Iowa. — Among the participants in the Fall meeting of the Northwest Chapter of The American Association of Rehabilitation Therapists were **Herman C. Lund,** Walla Walla, Wash., and **Sherburne W. Heath, Jr.,** Seattle. Dr. Lund spoke on "Medical Rehabilitation for the T.B. Patient"; Dr. Heath's topic was "Rationale and Technic of Breathing Exercises." — As President of the New York Society of Physical Medicine, **Hans J. Behrend,** New York City, spoke at a recent meeting of the American Association of Rehabilitation Therapists and The Association for Physical and Mental Rehabilitation. His topic was "Chronic Disease and Aging."

Walter M. Solomon, Cleveland, is now associated with the Cleveland Clinic Foundation. — **Maxwell D. Flank** has been appointed Chief of Physical Medicine and Rehabilitation Service, Veterans Administration Hospital, Hines, Ill., effective February 1, 1954. — **Earl C. Elkins,** Rochester, Minn.; **Robert L. Bennett,** Warm Springs, Ga., and **Walter J. Zeiter,** Cleveland, attended the Fiftieth Annual Congress on Medical Education and Licensure recently held in Chicago. — **Herman Kabat,** formerly of Vallejo, Calif., is now at the Maimonides Hospital, San Francisco. — **Jack Meislin,** Ardsley, N.Y., will be moderator of a discussion panel scheduled for the annual session of the American Psychiatric Association at St. Louis in May. The panel will discuss "The Contribution of Physical Medicine to the Rehabilitation of Psychiatric Patients." — **Eugene L. Jewett,** Orlando, Fla., is president

of the Orange County Medical Society of Florida.

Jose I. Tarafa, Havana, Cuba, was recently designated President of the Latin American Section of Physical Medicine and Rehabilitation of the Pan-American Medical Association. He will also serve as a member of the panel on physical medicine and rehabilitation at the Third International Poliomyelitis Congress in Rome in September of this year. Dr. Tarafa, who is Director of the Centro de Rehabilitation de Lisiados in Havana, was recently awarded the Medal de Orden Nacional de Marito "Carlos J. Finlay" for his accomplishments in medicine and rehabilitation. — **Arthur Steindler,** Iowa City, discussed "Low Back Pain" at the February 11 meeting of the Hollywood (Calif.) Academy of Medicine. — A film entitled "Work Therapy" was shown by **Capt. Clement C. Troensegaard,** Los Angeles, on February 4 at the Cedars of Lebanon Hospital Department of Rehabilitation. — Television viewers saw and heard **Nathan Sussman,** Harrisburg, Pa., speak on "Geriatrics" on January 15. Dr. Sussman's many activities include Director of the Heart Evaluation Unit of Tri-County Heart Association; Chief, Arthritis Clinic, Harrisburg Hospital, and Chairman Social and Scientific Committee of Harrisburg Academy of Medicine.

O. Leonard Huddleston, Santa Monica, Calif., was a member of a panel which discussed rehabilitation centers at the annual convention of the International Association of Industrial Accident Boards and Commissions at Coronado, Calif., last October. — **Francis J. Bonner,** Ardmore; **Murray B. Ferderber,** Pittsburgh; **Ruth N. Miller,** Sharon; **George M. Piersol,** Philadelphia; **Herman L. Rudolph,** Reading; **William H. Schmidt,** Philadelphia, and **Jesse Wright,** Pittsburgh, are serving on the committee Commission on Physical Medicine and Rehabilitation of The Medical Society of the State of Pennsylvania. **Albert A. Martucci,** Philadelphia, is chairman. — **George G. Deaver,** New York City, and **Frank H. Krusen,** Rochester, Minn., attended a recent meeting of the National Society for Crippled Children and Adults, Inc., held in Chicago. — "Who's Disabled?—A Dramatic Presentation of What Is Left—Not What is Lost" was the theme presented by **Donald A. Covalt,** New York City, at the Fourteenth Annual Congress on Industrial Health held in Louisville, Ky.

IN MEMORIAM

Dr. Nicholas J. Seybold, 64, of Toledo, Ohio, died January 21, 1954. He is survived by his wife, Frances, who is living at 2803 Summit St., Toledo. Dr. Seybold was a Congress member for many years.

RESIDENCIES IN PHYSICAL MEDICINE

Several residencies in physical medicine and rehabilitation are available immediately or through July 1, 1954. Further information regarding the availability of these positions and any additional data regarding the programs can be secured by corresponding directly with the hospitals concerned.

The location and number of residencies available and the person to whom inquiries should be directed are as follows: VA Hospital, Denver, 1, Dr. C. C. Hoffman; VA Hospital, Cleveland, 1, Dr. J. T. Wearn, Chairman, Dean's Committee, Western Reserve University School of Medicine, 2065 Adelbert Rd., Cleveland 6; VA Hospital, Aspinwall, Pa., 3, Dean's Committee, University of Pittsburgh Medical School, Pittsburgh 13; VA Hospital, Memphis, Tenn., 2, Dr. J. E. Cottrell, Chief, Professional Services; VA Hospital, Houston, 1, Chairman, Residency Review Board; VA Hospital, Wood (Milwaukee), Wisc., 1, Dr. W. E. Zeit, Secretary to Dean's Committee, Marquette University School of Medicine, Milwaukee; Los Angeles County Hospital, Los Angeles, 1, Dr. D. D. Hoytt; State of Connecticut Veterans' Home and Hospital, Rocky Hill, Conn., 3, Col. R. Watt, Commandant; Michael Reese Hospital, Chicago, 1, Dr. M. Levine, Medical Director; University Hospital, Ann Arbor, Mich., 3, Dr. J. Rae; University of Minnesota Hospital, Minneapolis, 1, Dr. F. J. Kottke, 205 TWH, University of Minnesota; Mayo Foundation, Rochester, Minn., 6, Director; Barnes Hospital, St. Louis, Mo., 1, Dr. S. Mead; Bellevue Medical Center, Division III-New York University College of Medicine, New York, 9, Dr. H. A. Rusk; Goldwater Memorial Hospital, New York, 2, Medical Superintendent; Hospital for Joint Diseases, 2, A. Rosenberg, Executive Director; Presbyterian Hospital, New York, 1, Dr. R. C. Darling; Mount Sinai Hospital, New York 1, Dr. M. Steinberg, Director; Rehabilitation Hospital, West Haverstraw, N.Y., 1, Dr. A. J. Canning, Director; Cleveland Clinic Hospital, Cleveland, 2, Admissions Committee.

REORGANIZATION PLANNED

Since the resignation of Dr. Herman Kabat as Medical Director of the Kabat-Kaiser Institute, these centers are being reorganized and henceforth will be known as the California Physical Medicine and Rehabilitation Center. Further announcements will be made when definite plans for a reorganization of the centers have been completed.

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EDITORIAL

ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION
OFFICIAL JOURNAL

American Congress of Physical Medicine and Rehabilitation
American Society of Physical Medicine and Rehabilitation

Controlled Clinical Investigation

In a recent paper entitled "A Placebo-Controlled Study of Ultrasound Treatment for Periarthritis," Mead et al[1] demonstrated the importance of adequate controls in clinical investigations. Although the series of patients studied by the authors was small, the method of study is noteworthy, since it employed a simple procedure for controlling results which could be adapted to similar studies of other agents. Controlled study of this kind is especially important in evaluating new procedures and modalities in the field of Physical Medicine. It is often surprising to observe the therapeutic effectiveness of a placebo. In the study just mentioned, the placebo was slightly more effective than the procedure being tested.

Recently a new parenteral injection treatment for psoriasis was thought by the investigator to be excellent, since seven out of ten patients showed a dramatic response. Among ten subsequent control cases of psoriasis, however, physiological saline injections produced equally dramatic results in six of the ten patients.

For the past quarter of a century the field of Physical Medicine has been plagued by enthusiastic published reports of uncontrolled clinical observations on new modalities. Eventually the enthusiasm abates and the true value of the new therapy, or lack of it, becomes apparent. How much more rapidly this might have been accomplished, however, if the new modality could have been evaluated early by well controlled laboratory and clinical study. The place of ultrasound, for example, in Physical Medicine could now be fairly well determined, if clinical reports so far published, had all been carefully controlled.

Wakim[2] in discussing the enthusiastic reports on ultrasound in European medical journals and at the Erlangen Congress on Ultrasound in 1949, remarked "In the appraisal of such findings, it is important to remember that no critical or scientific evaluation was given in any of the reports on ultrasonic therapy of this vast array of diseases." Fortunately, some well-controlled laboratory and clinical study is being given to ultrasound at the present time. We are not attempting to depreciate the value of ultrasonic therapy, but are simply using it as a current example to point the way to a quicker and better understanding and evaluation of any new modality in the field of Physical Medicine.

We should not ignore the value of laboratory study of the physiological and pathological effects of physical agents. They point the way to the controlled clinical study mentioned above. An example is the article in this issue of the *ARCHIVES* on ultrasound, "The Effects of Ultrasound on Chromosomes, Nuclei and Other Structures of the Cells in Plant Tissues" by Lehmann, Herrick and Krusen. These authors and their associates have contributed much to our un-

derstanding of the physiological action of ultrasound and other physical agents. Both laboratory and clinical investigation are essential in the adequate evaluation of new modalities in the field of Physical Medicine.

References

1. Mueller, E. E.; Maed, S.: Schulz, B. F., and Vaden, M.R.: A Placebo-Controlled Study of Ultrasound Treatment for Periarthritis. Am. J. Phys. Med. 33:31 (Feb.) 1954.
2. Wakim, K. G.: Ultrasonic Energy as Applied to Medicine. Am. J. Phys. Med. 32:32 (Feb.) 1953.
3. Lehmann, Justus F.; Herrick, J. F., and Krusen, Frank H.: The Effects of Ultrasound on Chromosomes, Nuclei and Other Structures of the Cells in Plant Tissues. Arch. Phys. Med. & Rehab. 35:141 (Mar.) 1954.

32nd Annual Session

SCIENTIFIC EXHIBIT SPACE

Requests for applications for scientific exhibit space in connection with the 32nd Annual Session to be held at Hotel Statler, Washington, D. C., September 6-11, 1954, are being received. Address all communications to the American Congress of Physical Medicine and Rehabilitation, 30 North Michigan Ave., Chicago 2, Ill.

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CLEVELAND SOCIETY PM&R

The next meeting of the Cleveland Society of Physical Medicine and Rehabilitation will be held Thursday, March 25. Mieczyslaw Peszczynski, M.D., Assistant Professor of Physical Medicine and Rehabilitation, Western Reserve University, will discuss "Some Aspects of Gait Training."

COLUMBIA PLANS JUNE WORKSHOP

A maximum of thirty-five professional workers will be admitted to a unique Field Workshop in Rehabilitation Teamwork which will be given in June under the joint sponsorship of Teachers College, Columbia University, and the Institute for the Crippled and Disabled in New York City. The group will be divided into rehabilitation teams which will also include staff members at the institute. Enrollees will function as internes in the rehabilitation center and have cases assigned to them.

In addition to the clinical experience, students will participate in rehabilitation seminars and daily case conferences. Individual counseling to students will be available.

Applications should be received before April 1, 1954. Blanks and further information can be obtained from Dr. Maurice Fourace, Teachers College, Columbia University, New York 27, New York. Tuition and supplies will cost $100, and students meeting the requirements of the college will be eligible to receive three graduate credits.

NEW TASK FORCE MEMBER

Dr. Theodore G. Klumpp, president of Winthrop-Stearns, Inc., has been appointed a member of the Task Force on Medical Services of the Commission on Organization of the Executive Branch of the Government, under the chairmanship of former President Herbert Hoover. The commission, originally authorized by Congress in 1947, was recreated last July.

Objectives are to: provide better medical care for beneficiaries of the federal medical program, create a better foundation for training and medical service in federal agencies, reduce the drain of doctors away from private practice, provide better organization for medical research, and provide a better state of medical preparedness for war.

AMERICAN GERIATRICS SOCIETY

The American Geriatrics Society will meet June 17-19, 1954, in San Francisco, immediately preceding the meeting of the American Medical Association. Physicians and other scientists interested in geriatrics may attend. Hotel reservations should be made through the San Francisco Convention and Visitors Bureau, 200 Civic Auditorium, San Francisco 2. Additional information may be obtained from the chairman of local arrangements, Dr. Laurance W. Kinsell, Highland Alameda County Hospital, 2701 Fourteenth Avenue, Oakland 6, Calif.

NEWLY REGISTERED THERAPISTS

January 15, 1954

Garrison, Dorothy Palestine, 171 N. Church St., Athens, Ga.

Hixson, Jacqueline Marcia, 22 "B" St. N. W., Miami, Okla.

McCaig, Samuel Graham, 696 W. 20th Ave., Vancouver, B. C., Canada.

Pierson, Frank McAdam, 1413 Delaware Ave., Wilmington, Del.

Ross, Howard Foster, Jr., PO 575, Auburn, Calif.

Scofield, Robert Dale, Box 254, Junction City, Ore.

January 22, 1954

Haas, Richard Irving, 1795 Riverside Dr., New York 34, N.Y.

Poulopoulos, Bill Demetrios, PO Box 282, Kentfield, Calif.

January 27, 1954

Agnew, Francis Cortland, 29 Park Pl., East Aurora, N.Y.

Bodnar, Eugene Henry, 5681 E. Lake Rd., Erie, Pa.

Granata, Frank James, 455 19th St., Niagara Falls, N.Y.

Paddock, George Clarke, 219 Oxford Ave., Buffalo 9, N.Y.

Schweichler, Richard Stanley, 1622 Abbott Rd., Lackawanna, N.Y.

Soldwisch, Marilyn Jean, 329 Schenck, North Tonawanda, N.Y.

Toland, Joan Marie, 310 Olympic Ave., Buffalo 15, N.Y.

Wactawski, John Stanley, 1420 Weaver Pkwy., North Tonawanda, N.Y.

January 29, 1954

Bondi, Richard William, 61 Main St., Genesco, N.Y.

Chism, James Clyde, c/o Washington Cty. Hospital, Fayetteville, Ark.

Church, Blanche Marie, 4810 Culmore Dr., Houston 21, Tex.

Hughes, Palmer Ferguson, 203 N. Friendship Rd., Paducah, Ky.

Lowry, Russell Allen, RR 1, Sharpsville, Ind.

February 4, 1954

Reichenbach, Virginia Eleanor, 1047 E. Chestnut St., Sunbury, Pa.

February 8, 1954

Sciera, John L., 861 Walden Ave., Buffalo 11, N.Y.

February 12, 1954

Anderson, Aelita Geske, 153 Eaton St., Providence, R.I.

Bates, Betty, 5 Shellton Rd., Quincy, Mass.

Gioia, Carilyn Jo, 5626 Columbia Ave., St. Louis, Mo.

Guthrie, Mary Alice, 3088 Calle Pinon, Santa Barbara, Calif.

Jacobson, Maysel Berniece, 108 E. Third, El Campo, Tex.

Roach, Bertie Jean, 901 Oak St., Savannah, Tenn.

Sanchez, Aida Nancy, 128 Insular St., Urb. E. Roosevelt, Hato Rey, P. R.

Vaughn, Mary Virginia, c/o Mary T. Moran, Box 159, Ft. Meade, S. D.

SOUTHERN SECTION MEETS

The Southern Section of the American Congress of Physical Medicine and Rehabilitation met February 26 and 27, at Brooke Army Hospital—Brooke Army Medical Center, Fort Sam Houston, Texas. The program presented, under the direction of Lt. Col. John H. Kuitert and Edward M. Krusen, Jr., included the following topics: Panel discussion on "Dynamic and Functional Bracing for Neuromuscular Disabilities," Captain Anthony L. Brittis, Major Vann S. Taylor, and Odon F. von Werssowetz; "Electrodiagnosis and Muscle Physiology in Neuromuscular Disease," Lt. Col. John H. Kuitert; "Newer Technics in Neuromuscular Reeducation," Captain David Rubin; "Physiological Aspects and Practical Considerations of the Poliomyelitis Patient in the Tank-Type Respirator," Captain Herbert Kent; "Assistive Devices in Functional Rehabilitation of Upper Extremity Disabilities," Odon F. von Werssowetz, Betty Schlosser, and Rose Elliott; "Etiology of Local and Referred Shoulder Pain," Major William V. Cruce; "Basic Fundamental Treatment Procedures in Rheumatoid Arthritis," E. Goldfain; "Functional Disorders of the Foot," C. DeWitt Dawson; "The Rationale of Pressure Dressings to the Leg," R. S. Fillmore; "Paralytic Poliomyelitis in Children Following Gamma Globulin Innoculation: Report of Two Cases in Siblings," 1st Lt. Maynard J. Brucker and Lt. Col. John H. Kuitert; "Demonstration of Facilitation Technics in Neuromuscular Reeducation," Captain David Rubin. Oscar O. Selke, Jr., spoke on "The Science and Philosophy of Muscles Over Thirty" at the dinner meeting of the group.

PENNSYLVANIA ACADEMY PM&R

The Pennsylvania Academy of Physical Medicine and Rehabilitation will meet March 20 at Valley Forge Army Hospital, Phoenixville, Pa. The following program will be presented:

"Clinical Electromyography" by Lt. Col. Edward B. Shires; discussed by Francis J. Bonner.

"Pain Threshold" by Capt. Thomas Guthrie; discussed by Herman L. Rudolph.

"Physical Medicine in the Treatment of Pre- and Post-Operative Chest Surgery Patients" by 1st Lt. Robert M. Krout; discussed by William H. Schmidt.

"Physical Medicine in the Treatment of Hand Surgery Patients" by 1st Lt. Sidney Barr; discussed by Harold Lefkoe.

There will be a short business meeting of the Academy following the scientific meeting. Address all communications to the Secretary-Treasurer, J. Murl Johnston, M.D., 694 Washington Rd., Pittsburgh 28, Pa.

NATIONAL PARAPLEGIA FOUNDATION FELLOWSHIPS FOR RESEARCH

Fellowships for research in basic and medical sciences bearing on the problems of paraplegia have been established by the National Paraplegia Foundation. They are open to residents of the United States or Canada who wish to pursue research on spinal cord function or disease and on problems related to complications of spinal cord injury or disease.

These fellowships are granted on recommendation of the Medical Advisory Committee. It is hoped that the establishment of these fellowships will promote interest in the problems of paraplegia and will provide for greater opportunities in personnel training.

Candidates for these fellowships will be accepted in each of the following categories: A. Postgraduate Medical, open to promising young investigators with M.D. degree, for prosecution of research, and B. Pre- and postdoctorate basic science, open to students at a graduate level.

Qualifications: The fellowships are open to residents of the United States or Canada who have demonstrated ability in research. The Fellows are expected to devote full time to research during tenure of the fellowship, except that by permission of the Medical Advisory Committee, they may attend advanced courses of study which require only a limited portion of their time. They may hold a title in the institution in which they are working

but may not accept additional salary from that or any other outside activity.

Applicants will be accepted from any field of the basic or medical sciences. Initially, however, preference will be given to candidates whose primary interest will be in the field of spinal cord function and disease or in complications arising from spinal cord injury.

Grants: Appointments and grants will be determined in each case by the Medical Advisory Committee. Appointments will run for one, two, or three years, subject to renewal for additional periods. The stipend will range from $3000 to $4000 yearly with the actual allowance depending upon the past record of the applicant in scientific work, the family obligations maintained and the cost of living in the location chosen for study. In exceptional cases grants may be made as high as $6000.

Location of work: The place where the Fellow wishes to work and the persons to whom he will be responsible for his work are subject to approval by the Medical Advisory Committee.

Further particulars and blank forms for use in making applications for these fellowships may be obtained on request. Address inquiries to Dr. L. W. Freeman, Chairman, Medical Advisory Committee, National Paraplegia Foundation, 1040 W. Michigan Street, Indianapolis 7, Indiana.

BOOKS RECEIVED

Books received are acknowledged in this column as full return for the courtesy of the senders. Reviews will be published in future issues of the journal. Books listed are not available for lending.

Primer of Cardiology (Second Edition) by George E. Burch; Lea & Febiger, Philadelphia, Pa.

Effective Use of Older Workers by Elizabeth L. Breckinridge; Wilcox and Follett Co., Chicago, Ill.

Shock and Circulatory Homeostasis edited by Harold D. Green; Josiah Macy, Jr. Foundation, New York, N.Y.

The Physics of Radiation Therapy by Harold E. Johns; Charles C Thomas, Springfield, Ill.

Slipped Capital Femoral Epiphysis by Armin Klein, et al; Charles C Thomas, Springfield, Ill.

Criteria for Retirement: A Report of a National Conference on Retirement of Older Workers edited by Geneva Mathiasen; G. P. Putnam's Sons, New York, N.Y.

Injuries of the Spinal Cord by George C. Prather; Charles C Thomas, Springfield, Ill.

Chemical Physiology of Contraction in Body and Heart Muscle by A. Szent-Gyorgyi; Academic Press, Inc., New York, N.Y.

Sacral Nerve-Root Cysts: Another Cause of the Sciatic or Cauda Equina Syndrome by I. M. Tarlov; Charles C Thomas, Springfield, Ill.

Design and Construction of General Hospitals by U.S. Dept. of Health, Education and Welfare, Public Health Service; F. W. Dodge Corp., New York, N.Y.

Diuretic Therapy by Alfred Vogl; The Williams & Wilkins Co., Baltimore, Md.

Recreation for the Aging by Arthur Williams; Association Press, New York, N.Y.

Leaders in American Science edited by Robert C. Cook; Who's Who in American Education, Inc., Nashville, Tenn.

Beschouwingen over de voorbereiding en de training van de vlakke loopkoersen in de athletiek by G. Cortebeeck and E. Vanden Eynde; E. Nauwelaerts, Leuven.

Adventures in Physiology with Excursions into Autopharmacology by Sir Henry Hallett Dale; The MacMillan Co., New York, N.Y.

Modern Concepts in Medicine by Julius Jensen; The C. V. Mosby Co., St. Louis, Mo.

Ceramic Sculpture by John B. Kenny; Greenberg, Inc., New York, N.Y.

Le Sport et les Lettres by Raymond Pouilliart and Jean Willems; E. Nauwelaerts, Louvain.

An Introduction to Electronics for Physiological Workers by I. C. Whitfield; St. Martin's Press, Inc., New York, N.Y.

Synopsis of Pediatrics by John Zahorsky; The C. V. Mosby Co., St. Louis, Mo.

Music Therapy 1952 edited by Esther G. Gilliland; National Association for Music Therapy, Lawrence, Kansas.

Nuclear Physics by W. Heisenberg; Philosophical Library, Inc., New York, N.Y.

Sex Ethics and the Kinsey Reports by Seward Hiltner; Association Press, New York, N.Y.

Review of Physiological Chemistry (Fourth Edition) by Harold A. Harper; University Medical Publishers, Los Altos, Calif.

A Source-Book of Medical Terms by Edmund C. Jaeger; Charles C Thomas, Springfield, Ill.

The Psychology of Personality by Bernard Notcutt; Philosophical Library, Inc., New York, N.Y.

Morris' Human Anatomy by J. Parsons Schaeffer; Blakiston Co., Inc., New York, N.Y.

Lesions of the Lumbar Intervertebral Disc with Special Reference to Rupture of the Annulus Fibrosus with Herniation of the Nucleus Pulposus by R. Glen Spurling; Charles C Thomas, Springfield, Ill.

Private World of Pain by Grace Stuart; The MacMillan Co., New York, N.Y.

A Ciba Foundation Symposium: The Spinal Cord edited by G. E. W. Wolstenholme; Little, Brown & Co., Boston, Mass.

Salt and the Heart by Edward T. Yorke; Drapkin Books, Linden, N.J.

Design for Decision by Irwin D. J. Bross; The MacMillan Co., New York, N.Y.

Roentgen, Radium and Radioisotope Therapy by A. J. Delario; Lea & Febiger, Philadelphia, Pa.

Textbook of Medical Treatment by Various Authors edited by D. M. Dunlop; The Williams & Wilkins Co., Baltimore, Md.

Practical Methods in Biochemistry by Frederick C. Koch and Martin E. Hanke; The Williams & Wilkins Co., Baltimore, Md.

The Physiology of Man by L. L. Langley and E. Cheraskin; McGraw-Hill Book Co., Inc., New York, N.Y.

The Pathology of Trauma by Alan Richards Moritz; Lea & Febiger, Philadelphia, Pa.

Physiological Cardiology by Arthur Ruskin; Charles C Thomas, Springfield, Ill.

From Fish to Philosopher by Homer W. Smith; Little, Brown & Co., Boston, Mass.

On Aphasia: A Critical Study by Sigmund Freud; International Universities Press, Inc., New York, N.Y.

The Practical Management of Diabetes by Edward Tolstoi; Charles C Thomas, Springfield, Ill.

Hypnotism: An Objective Study in Suggestibility by Andre M. Weitzenhoffer; John Wiley & Sons, Inc., New York, N.Y.

Hospital Purchasing File 1954 (31st Edition) by Everett W. Jones, et al; Purchasing Files, Inc., Chicago, Ill.

MDAA GRANT

Muscular Dystrophy Associations of America, Inc., has approved a grant totalling $28,102.75 to the University of Illinois College of Medicine for research into the cause and cure for muscular dystrophy.

Under direction of Dr. Ralph W. Gerard, professor of Neurophysiology and Director of Research Laboratories of the Neuropsychiatric Institute, the project embraces studies of "Metabolism and Membrane Potential of Skeletal Muscle Fibers and Relation to Function." The project will finance studies for the period from December, 1953, through November 30, 1954.

CONFERENCE ON EXERCISE

An all-day conference on "The Role of Exercise in Medical Practice" will be held Friday, April 16, at New York Medical College, Flower and Fifth Avenue Hospitals, Fifth Avenue and 106th Street, New York City. The conference will be sponsored by the Department of Physical Medicine and Rehabilitation, with Dr. Jerome S. Tobis, professor and director of the department, in charge.

Since the subject of exercise is one of increasing clinical importance, it is felt that the conference may help to clarify its role in clinical medicine. A group of prominent specialists in this field will speak.

Three speakers are scheduled for the morning session. They will discuss, "The Physiology of Exercise"; "Coordination of Muscle Action", and "Exercise Training in Health and Disease." Four panel discussions will be held in the afternoon. Subjects will be, "Role of Exercise in Muscular and Neurological Diseases"; "Role of Exercise in Cardiovascular Diseases"; "Role of Exercise in Joint and Orthopedic Diseases", and "Physical Performance of Handicapped in Industry".

MEDICAL RESEARCH FACES NEW CHALLENGE

With the development of a new vaccine for polio, scientific man has fought his way to the crest of the ridge in his war on infectious diseases. Medical research is now in a position to launch a new campaign against the disabling and crippling ailments such as heart disease, cancer, mental illness, and rheumatism.

"These illnesses blight the lives of millions and their families," declares Gilbert Cant in a provocative new twenty-five cent pamphlet "Medical Research May Save Your Life!" published by the Public Affairs Committee, 22 East 38th Street, New York.

As an indication of what might be accomplished if sufficient resources were devoted to research against the chronic illnesses, we are reminded of the dramatic progress which has been made in the past fifteen years against the infectious diseases.

AVAILABLE FELLOWSHIP FOR MEDICAL STUDENTS

The National Foundation for Infantile Paralysis has informed the deans of the medical and basic science schools in the United States that fellowships will continue to be available in 1954 for medical students who have completed at least two years of medical school work and who have eight weeks of consecutive free time to devote to extra-curricular study. The stipend will be $400.

Three types of fellowships will be offered: 1) research in the basic sciences related to medicine; 2) physical medicine and rehabilitation; 3) public health and preventive medicine. The dean of each school is invited to nominate one candidate for the research fellowship and two candidates for each of the other fellowships. Since the purpose of these programs is to enable the student to determine his own ability and aptitudes early in his career, no student who has had an equivalent orientation will be eligible.

For further information and for application forms, students should consult with the deans of their respective schools. Applications

should be submitted to the National Foundation for approval at least eight weeks prior to the beginning of the program.

MANUAL ON REHAB CENTERS

The first authoritative manual of information on the nation's rehabilitation centers has been published by the National Society for Crippled Children and Adults.

"Rehabilitation Centers in the United States," one of the most useful recent publications in the field of service for the crippled, grew out of the First National Conference on Rehabilitation Centers jointly sponsored by the National Society and the Office of Vocational Rehabilitation of the U. S. Department of Health, Education, and Welfare. The booklet was compiled by Henry Redkey, consultant on rehabilitation centers for the federal department.

The volume contains descriptions and statistics on every phase of rehabilitation procedure. It is available at $1.50 per copy from the headquarters of the National Society, 11 South La Salle St., Chicago 3.

MEDICAL JOURNALISM SCHOLARSHIPS

Courses in medical journalism are available at the schools of journalism of the Universities of Illinois and Missouri. These courses have been established through the efforts of the American Medical Writers' Association in conjunction with the interest and vision of the authorities of these schools. Members of the medical profession should know of these courses so that they may advise high school students and others who may be interested.

To help popularize these new collegiate medical journalism courses, the American Medical Writers' Association has established a Medical Journalism Scholarship Fund. The Association desires to make available continuing $500 scholarships at the University of Illinois, and at the University of Missouri.

The Association is incorporated not-for-profit, and contributions to it are exempt for income tax purposes. Checks should be made payable to the American Medical Writers' Association, but all correspondence should be directed to Richard M. Hewitt, M.D., Chairman, Educational Committee, A.M.W.A., Dept. of Publications, Mayo Clinic, Rochester, Minn.

UNREHEARSED REHABILITATION CASE CONFERENCE

A full scale unrehearsed rehabilitation case conference was presented by the staff of the Institute for the Crippled and Disabled for the New York Chapter, National Rehabilitation Association at that organization's monthly meeting.

The demonstration showed N.R.A. members how the many professional and technical personnel on the Institute's staff work together in a full team approach to determine the extent to which a handicapped person can benefit from rehabilitation and to develop a rehabilitation program tailored to fit that person's needs.

Special Visual Aids technics were utilized at the demonstration to make clear the function of each participant. Participating in the demonstration were physicians and therapists of the Institute's Medical Service; case workers, group therapists, psychologists and psychiatrists of the Social Adjustment Service; teachers, vocational counselors, group guidance workers and placement officers of the Vocational Rehabilitation Service, as well as those in the Institute's sheltered workshop, brace and limb and administrative activities.

DR. RUSK NAMED PRESIDENT OF FOUNDATION

General James A. Van Fleet, Chairman of the Board of Directors of The American-Korean Foundation announced that Dr. Howard A. Rusk has been elected President of the Foundation.

In the non-salaried post of President, Dr. Rusk will become the chief executive officer of the Foundation. In assuming the Presidency, Dr. Rusk stated that the Foundation would embark immediately upon a program to allocate approximately $1,000,000 to support health, educational and institutional programs in Korea and would increase the tempo of the Foundation's fund-raising activities.

Dr. Rusk headed two missions to Korea sent by the Foundation in March and August of last year.

A non-political, non-sectarian, non-profit organization of which Dr. Milton Eisenhower, President, Pennsylvania State College, is Honorary Chairman, the American-Korean Foundation has made cash allocations and grants of goods-in-kind totaling $3,200,000 to Korea within the past eight months. The Foundation's offices are at 345 East 46th Street, New York 17, New York.

NFIP POSTDOCTORAL FELLOWSHIPS

The National Foundation for Infantile Paralysis announces the availability of a limited number of postdoctoral clinical fellowships in physical medicine and rehabilitation to candidates who wish to become eligible for certification in that field.

Fellowships will cover a period of one to three years at training centers which have been approved for residencies in physical medicine and rehabilitation. Stipends to Fellows are based on the individual need of each

applicant. Appropriations of $475,000 in March of Dimes funds have been made to cover the cost of the program.

Eligibility requirements include United States citizenship, graduation from an approved school of medicine, completion of at least a one-year internship in an approved hospital, and a license to practice medicine in at least one state. The age limit is forty. Selection of candidates will be made on a competitive basis by a Clinical Fellowship Committee composed of leaders in the fields of medicine and professional education.

In addition to these full-term fellowships, the National Foundation is making available a limited number of short-term fellowships to physicians who wish to become better acquainted with physical medicine and rehabilitation as it relates to their particular specialties. Such training is being offered to physicians who, in addition to meeting the other requirements, have completed a minimum of one-year residency in orthopedics, pediatrics, neurology or internal medicine. For these fellowships which will cover a period of training of three months to one year at centers which place special emphasis on physical medicine in relation to the applicant's specialty, the National Foundation has provided a special appropriation of $51,050.

Complete information concerning qualifications and applications on both types of fellowships may be obtained from the Division of Professional Education, National Foundation for Infantile Paralysis, 120 Broadway, New York 5, N.Y.

EXAMINATION TO BE HELD

An examination for registration under the North Carolina Physical Therapy Practice Act will be given in Chapel Hill, N. C., on Friday, April 9, 1954. Application forms and further information may be obtained from Maria M. Kennedy, Secretary, The State Examining Committee of Physical Therapists, 123 West Seventh Street, Charlotte, N. C.

UCP ANNOUNCES APPOINTMENT

Miss Marguerite Abbott, who has been Executive Director of the Coordinating Council for Cerebral Palsy in New York City since 1950, will join the Program Division of United Cerebral Palsy as Technical Associate to the Medical Director. In her new capacity, Miss Abbott will coordinate and develop professional and technical plans, materials and training programs to aid in the development of UCP's national and local programs.

BELTONE HEARING INSTITUTE GRANTS $1,000 FOR RESEARCH

A grant of $1,000 to the audiology department of Northwestern University for electronic research equipment was announced by Sam Posen, chairman of the Beltone Institute for Hearing Research, Chicago. The equipment will be used in current studies aimed at improving technics of clinical testing of hearing loss.

The Beltone Institute anticipates developing and financing original research by leading universities and hearing centers on medical, sociological, industrial, and psychological problems associated with hearing loss.

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PHYSICAL MEDICINE ABSTRACTS

Oxygen Tension of Tissues by the Polargraphic. Method VI. Effect of Changes in Position on Oxygen Tension of the Skin of Toes. Phyllis G. Williams; Hugh Montgomery and Orville Horwitz.

J. Clin. Invest. 32:1097 (Nov.) 1953.

An attempt is made to demonstrate the effect of position of a limb on the oxygen tension in that limb. This is one means of investigating the generally accepted clinical impression that the ischemia of peripheral arterial occlusion is aggravated by elevation of the limb and relieved by lowering the limb. Fourteen persons with severe arteriosclerosis with occlusion and six normal persons were studied. The limbs of these individuals were studied in the horizontal, elevated and lowered positions and some of the studies were carried out on limbs in a horizontal position, but with the addition of a pressure cuff to increase the venous pressure. Platinum electrodes were inserted into the skin of the feet. With the proper voltage the current varies linearly with the oxygen tension of the electrode tip. Significant increases in the oxygen tension were observed in both the normal persons and the patients in the foot down position. Only the patients in the foot up position showed significant decreases in the oxygen tension. No changes in the oxygen tension were found in either group when the pressure cuff was used. This would indicate that capillary distention alone does not facilitate the passage of oxygen to the tissues. Since a foot down position increases the oxygen in the tissues, an objective reason is evidenced for the dependent position of the foot for therapeutic reasons.

Effect of Surgical Sympathectomy on the Sensitivity to Epinephrine of the Blood Vessels of Muscular Segments of the Limbs. Robert S. Duff.

J. Clin. Invest. 32:851 (Sept.) 1953.

This investigation provides evidence that hypersensitivity of the vessels of skeletal muscles in the upper and lower limbs to epinephrine may result from pre- and postganglionic sympathectomy in man. The blood flow responses to epinephrine were measured plethysmographically in normal and sympathectomized limbs. Alternate periods of intravenous infusions of saline and saline with epinephrine were given each subject and blood flow measurements recorded every half minute. The first infusion of epinephrine produced a greater flow on the sympathectomized side than on the normal side and vasodilatation occurred thirty seconds earlier in the sympathectomized side than in the normal side. The data collected make it apparent that the vasodilatation at the beginning of the epinephrine infusion was usually greater in the sympathectomized than in the normally innervated limbs, but that during the second phase (last four minutes) of the epinephrine infusion, the normal dilatation was reduced or absent in the sympathectomized limbs. This reversal of normal second phase dilatation in the sympathectomized limbs is explained as an increased sensitivity response of muscle vessels to the direct constrictor action of epinephrine. These phenomena are shown to occur in limbs sympathectomized either by preganglionic section or by ganglionectomy.

The Clevedon Positive Pressure Respirator. J. Macrae; G. D. McKendrick, et al.

Lancet 265:971 (Nov. 7) 1953.

A positive pressure respirator designed on principles laid down by Lassen and Bang of Denmark is illustrated and described. Essentially it consists of a slide valve operated by electromagnets actuated by electrolytic switches. It runs on a 12 volt battery delivering 1 ampere of current. Therefore, it can be operated independently of the main electrical supply. Air enriched with oxygen is supplied in a circuit closed by a tracheal cuff. The machine is of a self-demand type and has an automatic safety valve. There is only one moving part which can be changed in less than thirty seconds. The air/oxygen mixture, the speed, depth, and inspiration/expiration ratio can all be controlled. A case is described in which a serious case of polio-

myelitis in a Drinker respirator started developing respiratory difficulties which were rapidly relieved by tracheotomy and institution of positive pressure breathing. The advantages from the point of view of nursing care are obvious.

Dyspeptic Backache. J. W. Beattie.

Ann. Rheumat. Dis. 12:223 (Sept.) 1953.

Five patients with symptoms of backache and subsequently shown to have gastro-intestinal pathology are presented and described. Two of these cases had large peptic ulcers; one in the duodenum and the other in the stomach, but both eroding posteriorly and involving the pancreas. A third case, whose main complaint was backache, was shown subsequently to have a carcinoma of the pancreas. The last two cases were not confirmed by operation or autopsy. However, in all these cases the major symptom had been backache and gastro-intestinal symptoms were minimal even on direct questioning. Recent work leads one to believe that pain impulses are carried along afferent fibers running with visceral nerves and are then referred like other sanative pain impulses. The importance of backache as occasionally being the solitary symptom of gastro-intestinal dysfunction is stressed.

Children in Hospital. Ronald MacKeith.

Lancet 265:863 (Oct. 24) 1953.

The importance of trying to understand a child's point of view, when admitted to hospital, particularly when for operation, is emphasized. Children under five years of age suffer most psychological trauma. This usually stems from three major anxieties: (1) separation from parents and home environment; (2) fear of anesthesia, and (3) fear of operation. These can be partly counteracted by: (1) allowing child to bring some of its home environment to hospital, favorite doll, clothes, etc.; allow as much regular visiting as feasible; (2) adequate preoperative sedation to overcome the fears of going under the anesthesia; rectal sodium thiopentone is suggested, and (3) before the operation, tell the child about the operation and postoperative effects. In addition, emphasize to the parents the need for constant reassurance and affection in the postoperative period.

The Sequelae of Thrombophlebitis. Joseph C. Luke.

Angiology 4:413 (Oct.) 1953.

The seriousness of thrombophlebitis and the importance of early diagnosis are stressed. It is important to diagnose the condition before it has progressed proximal to the junction of the profunda femoris and femoral veins, in which case the femoral vein can be ligated. If the disease has proceeded proximal to this point conservative measures must be resorted to, i.e., rest and anticoagulant therapy. In femoral thrombophlebitis not only has occlusion of the femoral vein usually occurred but also the main lymphatic trunks are stenosed by fibrosis. Usually these changes in lymphatics are irreversible. The author prescribes "a new way of life" in the rehabilitation of all his patients who have had thrombophlebitis. This treatment consists of: (1) wearing elastic stockings daily; (2) not standing for more than thirty minutes without resting for fifteen minutes with extremities elevated; (3) lying down for two half-hour periods a day with leg raised to a forty-five degree angle; (4) always elevating affected leg when sitting; (5) raising the foot of the bed six inches; (6) avoiding irritation to the leg, e.g., sunburn, use of hot water bottle; (7) applying bland cream to the skin of affected leg, and (8) avoiding all trauma, e.g., bumping, bruising, and scratching affected leg.

Choice of Operation in Chronic Arthritis of the Hip. W. D. Coltart.

Ann. Rheumat. Dis. 12:198 (Sept.) 1953.

There are three operative alternatives for the patient with chronic arthritis of the hip —(1) Arthrodesis: This provides a strong, secure, fixed limb and is suitable for the patient who is active and will use his extremity strenuously. The knee joint must be mobile and the spine reasonably supple. (2) Reconstruction: a) Vitallium mold arthroplasty; b) Acrylic head prosthesis, and c) Batchelor's operation (excision of head and neck of femur and osteotomy). These operations should be used if both hips and one or both knees are affected, or if the back is stiff, or if a mobile hip is a necessity. Its use is preferable in the obese or ill patient who cannot tolerate long periods of immobilization in a plaster cast or at bed rest. Decision between types of reconstruction depends on the local condition at the time of operation. (3) Denervation: For the patient with a mobile hip, no deformity and pain localized in the groin. Pain relief is probably only temporary.

BOOK REVIEWS

The reviews here published have been prepared by competent authorities and do not necessarily represent the opinions of the American Congress of Physical Medicine and Rehabilitation and/or the American Society of Physical Medicine and Rehabilitation.

THE NEUROPHYSIOLOGICAL BASIS OF MIND. THE PRINCIPLES OF NEUROPHYSIOLOGY. By *John Carew Eccles*, Professor of Physiology, The Australian National University, Canberra. Cloth. Price, $6.50. Pp. 314, with illustrations. Oxford University Press, 114 Fifth Avenue, New York 11, 1953.

This book, representing eight lectures given at Oxford, covers the broad field of the principles of neurophysiology. It starts with a discussion of the action current of the nerve impulse and the ionic hypothesis. Established investigative dates are discussed and summarized in relation to the resting and active membrane, so that the entire story of the properties of nerve and muscle fibers relative to generation and propagation of impulses is reviewed in the first two chapters.

Next, transmission of impulses across peripheral junctions is dealt with, including the neuromuscular at the motor end-plate and synaptic transmission in sympathetic ganglion. This is followed by discussion of the electrophysiology of the central nervous system including reflex activity, central inhibition and the transmission of information. Explanations of learning processes and conditioned reflexes are given and finally a discussion of the mind-brain problem.

This is a text for scientists familiar with the literature of basic neurophysiology rather than for the clinician or philosopher. It is well documented with selected references and illustrated with appropriate diagrams, graphs and electrograms.

AVIATION TOXICOLOGY. Prepared under the direction of the Committee on Aviation Toxicology, Aero Medical Association. Cloth. Pp. 120. The Blakiston Company, 575 Madison Avenue, New York, 1953.

This important book is addressed primarily to engineers who design aircraft, to medical personnel concerned with the health and safety of crews and passengers, and to toxicologists who may be called upon to discover the cause of the accident. The first manifestations of poisoning are varied, from the complaint of the pilot that he sees two railroad tracks where he knows there is but one, to the demand of a flying instructor that the window be opened. The possible causes are antifreezing agents, exhaust gases and smoke, fire extinguishants, hydraulic fluids, propellants, refrigerants, insecticides, and chemicals accepted for transportation. These are discussed in the order given. There is an alphabetical collection of data on individual chemicals, a collection of toxicity data in the form of curves and numerical information, a bibliography, and an index. The text can be read with profit by any physician because so much of the material represents very recent developments and because the authors have enlivened it by including brief illustrative "incidents." The book is recommended as both valuable and interesting.

THE CONCEPTION OF DISEASE. ITS HISTORY, ITS VERSIONS AND ITS NATURE. By *Walther Riese*, M.D. Fabrikoid. Price, $3.75. Pp. 120. Philosophical Library, 15 East 40th Street, New York 16, 1953.

This is really a history of the conception of disease and the author's evaluation of various opinions. The different chapter headings show the development. Following are a few of the conceptions—stoic, platonic, anthropological, moral, historical, physiologic, and anatomical. In the discussion of the moral concept, the author relies upon Freud and Rousseau. It is questionable if all would consider these two writers as the best references. In the biographic idea, he cites the psychoanalyst since he does not examine the patients; in the anatomical idea the thoughts of Leonardo da Vinci are expressed, with conclusions that appear ill founded: those of Morgagni and Virchow appear to be more logical. The author deals with "disease" in the broad sense of loss of good health. It is an interesting work and the result of much painstaking investigation.

THE PLURIPOTENCY OF THE HYPOPHYSEAL HORMONES AND THE CONSEQUENCES FOR ENDOCRINOLOGY AND CANCEROLOGY. By *Dr. Jules Samuels,* Specialist for endogenous endocrinotherapy, Director of the central institution for the Samuels-Therapy, Amsterdam. Paper. Price, 37 guilders. Pp. 296. N. V. Cycloscoop, Honthorststraat 22, Amsterdam-Z, Holland, 1953.

This is a part of the second volume of a five volume work on the "Endogenous Endocrinotherapy, Including the Causal Cure of Cancer." The author has a theory that the anterior pituitary secretes "one hormone with an accelerating action and one with a retarding action on cell-respiration" which are the eosinophils and the basophils. He proposes that these two hormones possess several characteristics or are "pluripotent." A summary of his conception is that the retarding factor of cell function is the gonadotropic hormone secreted by the basophilic cells and that the accelerating factor or cell-enlarging or thyrotropic hormone is secreted by the eosinophils. Much of these studies were done by means of spectroscopic observation. He examined some 30,000 publications. A tremendous amount of effort has been done to substantiate his theories.

The book is not easy reading and his conclusions are not too convincing. Much of it is repetitious. Fifty seven pages of references are included.

PHYSIOLOGICAL FOUNDATIONS OF NEUROLOGY AND PSYCHIATRY. By *Ernst Gellhorn,* M.D., Ph.D., Professor of Neurophysiology, University of Minnesota, Minneapolis. Cloth. Price, $8.50. Pp. 556, with 107 figures. University of Minnesota Press, Minneapolis, Minn., 1953.

This is an important contribution to medical literature since it brings to the clinician a critical analysis of basic research in physiology, so condensed that it can be applied to clinical problems. Although directed primarily to the neurologist and psychiatrist, a large portion of the book deals with neuromuscular function, one of the basic concepts of the practice of Physical Medicine.

The introductory chapters discuss the fundamental knowledge of the nature of neuronal activity, including basic reflexes and the influence of intrinsic and extrinsic factors of the environment. A separate section is devoted to the physiology and pathology of movements of special interest to physiatrists. There is an interesting discussion of the physiological basis for exercise technic described by Kabat and associates. One chapter is concerned with electromyography and another with restitution of movements after central lesions, such as vascular accidents resulting in hemiplegia.

Of more interest to the neuropsychiatrists are the chapters on the physiology of consciousness, the basis of emotion and the application of shock treatment and other forms of therapy for schizophrenia, psychoneuroses and functional psychoses. There is an extensive bibliography of over 1200 references. Most of the illustrations are related to electromyography.

The book is highly recommended as a standard reference for neuropsychiatrists and physiatrists.

ENCYCLOPEDIA OF ABERRATIONS. A Psychiatric Handbook. Edited by *Edward Podolsky,* M.D., State University of New York Medical College. With a foreword by *Alexandra Adler,* M.D., New York University College of Medicine. Cloth. Price, $10.00. Pp. 550. Philosophical Library, Inc., 15 East 40th Street, New York 16, 1953.

Various human aberrations are considered including sexual, mental, emotional, religious, social, sensory, perceptive and others. A large number of subjects are concerned with the sexual aberrations which are based on the Freudian concept. Many terms are defined with a few words whereas others are discussed at some length. The author has employed fifty-nine contributors in the preparation of this work. Many of them are nationally known psychiatrists. Their names are affixed to the topics they prepared. According to the author, this volume has been written for "intelligent laymen as well as the expert in interpersonal relationships."

MANUAL OF UPPER EXTREMITY PROSTHETICS. By staff, Artificial Limbs Project, Department of Engineering, University of California, Los Angeles, California. Edited by *R. Deane Aylesworth.* Publication of Artificial Limbs Research Project, under supervision of Advisory Committee on Artificial Limbs, National Academy of Sciences—National Research Council, supported by contract with Veterans Administration. Cloth, loose-leaf. No pagination, with illustrations. National Research Council, 2101 Constitution Ave., Washington 25, D. C., 1952.

This manual is a concise, but detailed summary of the results of a research project on upper extremity prosthetics. It includes engineering details of primary interest to the limb manufacturer, but at the same time there is discussion of the reason for using different types of hinges, terminal devices and other units available, which is the chief concern of the prescribing physician. The importance of a team of specialists is emphasized. This includes the doctor, physical therapist, occupational therapist, social worker or rehabilitation counselor and a prosthetist familiar with

these latest methods of manufacture and fitting.

The manual describes in detail the methods of measuring, manufacturing and fitting sockets of laminated plastic and incorporating the various types of hinges, locks, and terminal devices now available. Included also are the methods of harnessing so vitally important in successful use of the artificial arm.

This is a "must" item for physiatrists and surgeons prescribing artificial limbs, also for physical and occupational therapists who train the patients, and for the limb manufacturers.

INTRODUCTION TO PHYSIOLOGICAL AND PATHOLOGICAL CHEMISTRY. By *L. Earle Arnow*, Ph.G., B.S., Ph.D., M.B., M.D., Vice President and Director of Research, Sharp & Dohme Division of Merck & Co., Inc., West Point, Pennsylvania; Professor of Chemistry, Bryn Mawr College Summer School of Nursing, Bryn Mawr, Pennsylvania, 1941-1943, 1945; formerly Assistant Professor of Physiological Chemistry, University of Minnesota Medical School, and Lecturer in Physiological Chemistry to Students Enrolled in the University of Minnesota, School of Nursing, Minneapolis. Revised with the Assistance of *Marie C. D'Andrea*, R.N., B.S. in Nursing Education, Educational Director, School of Nursing, St. Vincent's Hospital, Indianapolis. Fourth edition. Cloth. Price, $3.75. Pp. 508, with illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1953.

On the whole, the book seems satisfactory for its intended purpose, to serve as an introductory course in chemistry for students in nursing and allied fields.

The theoretical chemistry is handled very well. There is a remarkably good organization of extensive material so that the book can be adapted to courses of varying length.

In the area of application of chemistry to medicine, the book is somewhat inadequate. The section on blood chemistry includes values in obsolete units frequently based on whole blood rather than usual serum determinations. It is unfortunate that certain controversial clinical concepts such as endogenous obesity and Simmond's cachexia have been included.

INTRODUCTION TO LABORATORY CHEMISTRY. By *L. Earle Arnow*, Ph.G., B.S., Ph.D., M.B., M.D. Fourth edition. Cloth. Price, $1.50. Pp. 108, with illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1953.

This is a new edition of the laboratory manual which is meant to be used to accompany the textbook "Introduction to Physiological and Pathological Chemistry" by the same author and collaborators. It is thoroughly recommended for this purpose.

REDUCING COOKBOOK AND DIET GUIDE. By *Llewellyn Miller*, Introduction by Dr. *James R. Wilson*, Secretary, Council on Foods and Nutrition, American Medical Association, Chicago. Foreword by *Frances M. Telsey*. Cloth. Price, $2.75. Pp. 262, with illustrations by *Ava Morgan*. Thomas Y. Crowell Company, 432 Fourth Ave., New York 16, 1952.

Here is an excellent cookbook and diet guide. Many appetizing menus and recipes have been developed, including hors d'oeuvres and cocktails. It is interesting to note that recipe instructions are so simple that even the amateur in the kitchen will follow them with ease. The book is written in a readable style, an example of which is the following profound statement "Don't talk about your diet—just follow it." It will prove especially encouraging to the "new and chronic" dieters.

THE GREEN AND RED PLANET. By *Hubertus Strughold*, M.D., Professor of Aviation Medicine, Head of Department of Space Medicine, U. S. Air Force School of Aviation Medicine. With editorial assistance and a foreword by *Green Peyton*. Cloth. Price, $4.00. Pp. 107, with illustrations. The University of New Mexico Press, Albuquerque, New Mexico, 1953.

The final paragraph is worthy of quoting—"We leave the question, until that day when the first traveler steps out of a space ship onto the green and red planet. It will be for him to tell us whether he finds an exotic vista of living things, burgeoning luxuriantly by processes unknown to us; or a simple prospect of humble lichens, reviving and declining with the seasons, as this book suggests; or a lifeless landscape stretching monotonously to the horizon, on which some optical illusion like a mirage produces the effect that appears to us as vegetation."

The author examines many of the possibilities of life on Mars by scientific observations and rational deductions. This will definitely not satisfy the teenagers with their "gregarious minds," which are no doubt influenced somewhat by the pictorial strips in the daily paper. Perhaps some proud father who is hard put to keep up with the imagination of his young offspring will secure some answers in these pages.

This is a most interesting book—a real treat to read, and extremely well written. It should fascinate anyone who is intrigued when he looks at the stars at night. The author is an international authority on avia-

tion medicine: this interest, combined with his original studies in physiology and biology, makes his explanations and conclusions stimulating and understandable.

SEXUAL BEHAVIOR IN THE HUMAN FEMALE. By the Staff of the Institute for Sex Research, Indiana University, *Alfred C. Kinsey, Wardell B. Pomeroy, Clyde E. Martin* and *Paul H. Gebhard*, Research Associates. *Jean M. Brown*, Research Assistant, Library; *Cornelia V. Christenson*, Research Assistant, in charge of Reference Research; *Dorothy Collins*, Research Assistant, Statistical Calculator; *Ritchie G. Davis*, Research Associate, Legal Studies; *William Dellenback*, Research Assistant, Photographic Studies; *Alice W. Field*, Research Associate, Legal Studies; *Hedwig G. Leser*, Research Assistant, Translator; *Henry H. Remak*, Special Translator; and *Eleanor L. Roehr*, Research Assistant, Secretary. Cloth. Price, $8.00. Pp. 842. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1953.

The much publicized sequel to "Sexual Behavior in the Human Male" is a very interesting and readable study of the sexual behavior of the female. This work presents material from personal interviews with approximately 8,000 women. Incidentally, the study deals only with white females not in prison.

The method and scope of the study is described as well as the sources of data employed. Complete development of the types of sexual activities among females is listed.

The book is an excellent contribution to the field of sex research, but it should be noted that only the mature reader will find it a valuable guide to the understanding of many sex problems.

It is well illustrated with tables, figures, and charts and has an unusually fine bibliography.

THE FOUNDERS OF NEUROLOGY: ONE HUNDRED AND THIRTY-THREE BIOGRAPHICAL SKETCHES PREPARED FOR THE FOURTH INTERNATIONAL NEUROLOGICAL CONGRESS IN PARIS. By eighty-four authors. Edited by *Webb Haymaker*, M.D., Chief, Neuropathology Section, Armed Forces Institute of Pathology, Washington, D.C. With bibliographical and editorial assistance of *Karl A. Baer*, bibliographer, Army Medical Library, Washington, D.C. Cloth. Price, $10.50. Pp. 479, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England: Ryerson Press, 299 Queen St., W., Toronto, 2B, 1953.

This is a collector's item for all those interested in Neurology and the history of medicine. The authors of these biographical sketches are also outstanding men of science, adding to the illustriousness of this book. The brief sketches are thoughtfully written and summarize the important scientific work of each subject, thus in effect bringing to the reader a collection of neurological data of lasting value as well as of historical interest. The numerous portraits and autographs add to the appeal of the book and the selected references make it of especial value to students.

PHYSIOLOGICAL AND THERAPEUTIC EFFECTS OF CORTICOTROPIN (ACTH) AND CORTISONE. By *Dwight J. Ingle*, B.S., M.D., Ph.D., Senior Research Scientist (Physiologist), Upjohn Company, Kalamazoo, Mich., and *Burton L. Baker*, B.A., M.S., Ph.D., Professor of Anatomy, University of Michigan Medical School, Ann Arbor. Publication number 179, American Lecture Series, monograph in American Lectures in Metabolism. Edited by *Paul Gyorgy*, M.D., *Louis Leiter*, M.D., and *S. O. Waife*, M.D. Cloth. Price, $5.50. Pp. 172, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.: Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England: Ryerson Press 299 Queen St., W., Toronto, 2B, 1953.

Many works have appeared during the past few years about these two compounds. It is impossible to keep up with the literature. Here in one small volume is the most pertinent information available up to the time of press in 1953.

Much of the material has been presented by the two authors who consider themselves laboratory men. They sought the help of clinicians for the therapeutic effects of the drugs and it is fitting that they chose Dr. H. F. Polley for contributions in the rheumatic diseases.

The book is highly recommended for physicians and students. It maintains the high standards of the books comprising the American Lecture Series.

ON BURNS. Compiled and edited by *Nathan A. Womack*, M.D. Participants: Dr. *William Altemeier*, et al. Publication number 165, American Lecture Series, monograph in Bannerstone division of American Lectures in Surgery. Edited by *Michael E. De Bakey*, M.D., Professor of Surgery, Baylor University College of Medicine, Houston, Texas, and *R. Glen Spurling*, M.D., Clinical Professor of Surgery, University of Louisville, Louisville, Ky. Plastic Surgery Division. Editor: *James Barrett Brown*, M.D., Professor of Clinical Surgery, School of Medicine, Washington University, St. Louis. Cloth. Price, $5.50. Pp. 178, with 7 illustrations. Charles

C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, 1953.

This is a short monograph of the American Lecture Series discussing the problems that arise from severe burns. The open and close treatments of acute burns are compared. The evaluation and treatment of pain in the acute case; the problem of burn shock and its treatment with blood, plasma and plasma derivatives; and the role of the adrenal cortex, ACTH, and cortisone in the treatment of severe burns are discussed. There is no specific discussion of physical therapy for burns. Otherwise, this is a good treatise on the therapeutic principles involved in the treatment of severe burns.

HEALTH PRINCIPLES AND PRACTICE. By *C. V. Langton*, B.S., M.S., Dr. P.H., Ed.D., Director of Physical Education, Oregon State College; Formerly Visiting Professor, University of Michigan, University of Hawaii and *C. L. Anderson*, B.S., M.S., Dr. P.H., Professor of Hygiene and Health Education, Oregon State College; Formerly Professor of Biological Science and Health Education, Michigan State College; Head and Professor of Physiology, Hygiene, and Public Health, Utah State Agricultural College; Visiting Professor, University of Utah, University of the State of New York. Cloth. Price, $4.25. Pp. 417, with illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1953.

Attractively illustrated and bound, this book offers a well-rounded, compact summary of personal and community hygiene. The thirteen chapters take up fundamental concepts in the field of health; heredity and genetics; mental health; nutrition; exercise, fatigue, and rest; safety; air and sunlight; special problems relating to the skin, mouth, and sense organs; reproduction; poisons; communicable diseases; international and national health services; state and local health services. In these last, especially, the information is commendably concrete and illuminating. The chapter on nutrition is also helpful in the detailed planning of diets. An effort is made to speak in terms of fact throughout. The effort succeeds in most parts of the book, but breaks down occasionally, especially in the section on mental health. For the confusion in this field, however, the authors are not so much to blame as are the authorities on whom they depend. The section on color-blindness needs to have included important new information on the extent and diversity of normal individual differences in color vision and to indicate what can be done in a positive way to make sure that signals shall be distinguishable by the greatest possible number of people. The section on posture unfortunately omits ill-designed chairs, working surfaces at the wrong level, and misdirected lighting as important causes of habitually poor posture, and the naive description of a single normal sitting posture conflicts with what can be seen at any meeting of hygienists. These are minor flaws in a book which, taken as a whole, deserves high praise. It should be widely read.

THE MANAGEMENT OF PAIN. With Special Emphasis on the Use of Analgesic Block in Diagnosis, Prognosis, and Therapy. By *John J. Bonica*, M.D., Director, Department of Anesthesia, Tacoma General and Pierce County Hospitals; Clinical Associate, Department of Anatomy, University of Washington Medical School, Seattle, Washington; Senior Consultant in Anesthesiology, Madigan Army Hospital, American Lake Veterans Administration Hospital, Western State Hospital, Northern Pacific Hospital, Doctors Hospital, U.S. Penitentiary, Tacoma, Washington. Cloth. Price, $20.00. Pp. 1533, with illustrations. Lea & Febiger, Washington Square, Philadelphia 6, 1953.

This new book presents a tremendous amount of well organized, up to date and clearly presented material.

An interesting introductory chapter gives a short history of man's efforts to alleviate pain. The book is divided into three parts: the fundamentals of pain; the methods and technics of managing pain, and the various diseases or disorders in which pain is a predominating and difficult feature to control.

The first part considers the cause for pain on anatomical, neurophysiological, physiopathological and the psychological bases. Here are contained all the important investigations that have been carried on for many years. The information in these 131 pages supplies a complete treatise on the types and mechanisms for the symptom of pain.

The second part makes up the bulk of the book. Section A on analgesic block covers 400 pages. This is done in a most comprehensive manner with much detail devoted to the technic of nerve block in the different areas of the body. The illustrations are numerous and very helpful. Section B is entitled "Other Methods Used as Adjuvants to Analgesic Blocking in Management of Pain." In this section the following subjects are discussed: opiates and other analgesics; psychotherapy; physical therapy; orthopedic methods; roentgen therapy, and neurosurgical methods. Different authors contributed the material for these chapters. Not all physiatrists will agree with the explanations for the use of physical agents offered by Col. Clark Williams, but it is a good chapter and what is unusual and definitely commendable, is the inclusion of physical medicine as a factor in the management of pain.

The third part on pain syndromes begins with two chapters on the examination of the patient and a general consideration for the differential diagnosis. Much good and practical help is offered in these few pages. Many tests are included. The numerous charts and tables from the "Pain Clinic" of the Tacoma General Hospital are worthy of printing as a separate monograph. It would be the answer to the prayers of busy practitioners and students. It also demonstrates the thought and study the author has given to the subject of pain. Other sections of this third part consider pain from neurogenic, somatic, visceral and peripheral vascular origins. The last three chapters discuss the methods for the control of the intractable pain associated with cancer in different regions of the body.

This is a notable contribution to medical literature. It should be an invaluable reference book for all physicians regardless of their specialty.

LIVING WITH A DISABILITY. By *Howard A. Rusk*, M.D., and *Eugene J. Taylor*. In collaboration with *Muriel Zimmerman*, O.T.R., and *Julia Judson*, M.S. The Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center. Cloth. Price, $3.50. Pp. 207, with illustrations. The Blakiston Company, Inc., Garden City, N. Y., 1953.

Here in book form are the mimeographed sheets of the Self Help devices that have been available in most departments of physical medicine and rehabilitation. The handicapped can now secure copies for themselves.

Through the generosity of the New York Institute of Physical Medicine and Rehabilitation, most of the personnel in departments of physical medicine are well acquainted with contents of this book and have found the suggestions of inestimable value. This contribution of Dr. Rusk and his staff has made living better and easier for many handicapped individuals.

Two copies of this book should be in every Physical Medicine Department—one for the staff, and the other in the waiting room for the patients. It is suggested that the one in the waiting room be chained to the wall of the building because most patients would wish to take the copy home without any qualms of conscience, since it would be helpful to so many persons.

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— MEMBERSHIP NEWS —

Archives of Physical Medicine and Rehabilitation

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What?

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American Congress of Physical Medicine and Rehabilitation
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(See Page 186 for Alphabetic Listing)

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American Society of Physical Medicine and Rehabilitation

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"Laboratory Studies on the Use of Ultrasonics in Medicine"..... Frank H. Krusen, M.D.
Discussant: Paul A. Nelson, M.D.

"Effective Care of the Hemiplegia"..... Herman Bearzy, M.D.
Discussant: Bert Treister, M.D.

"The Treatment of Osteoarthritis of the Cervical Spine"..... Walter J. Zeiter, M.D., and Paul A. Nelson, M.D.
Discussant: Roger Davis, M.D.

"Civilian Hospitals as Rehabilitation Centers"..... Ralph Worden, M.D.
Discussant: Keith Keeler, M.D.

"The Present Day Management of Fractures of the Hip"..... Joseph E. Brown, M.D.
Discussant: J. D. Wilson, M.D.

"Recent Advances in the Diagnoses of Peripheral Nerve Lesions"..... Harry T. Zankel, M.D.
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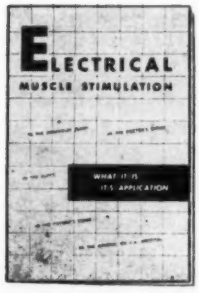

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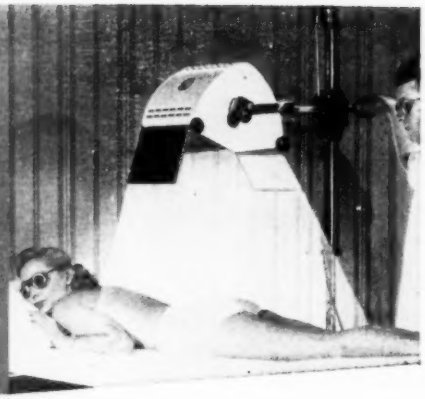

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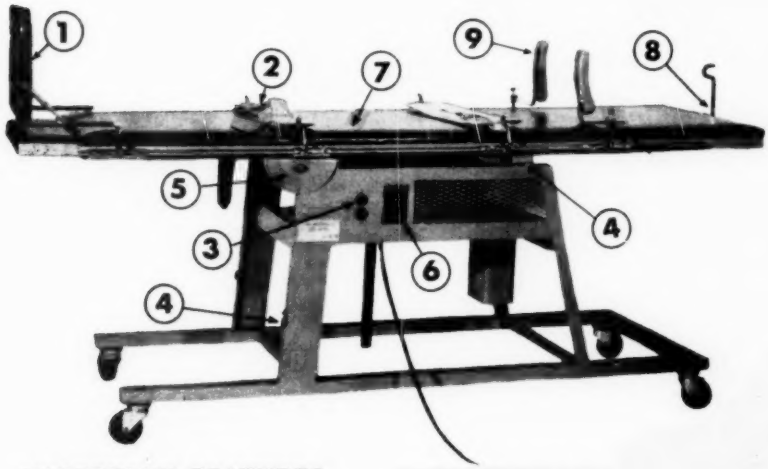

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To stimulate interest in the field of physical medicine and rehabilitation, the American Congress of Physical Medicine and Rehabilitation will award annually, a prize for an essay on any subject relating to physical medicine and rehabilitation. The contest, while open to anyone, is primarily directed to medical students, internes, residents, graduate students in the pre-clinical sciences and graduate students in physical medicine and rehabilitation. The Annual Awards Committee suggests that members of the American Congress and American Society of Physical Medicine and Rehabilitation bring this announcement to the attention of interested persons. The following rules and regulations apply to the contest:

1. Any subject of interest or pertaining to the field of physical medicine and rehabilitation may be submitted.

2. Manuscripts **must be** in the office of the American Congress of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2, not later than June 1, 1954.

3. Contributions will be accepted from medical students, internes, residents, graduate students in the pre-clinical sciences, and graduate students in physical medicine and rehabilitation.

4. The essay must not have been published previously.

5. The American Congress of Physical Medicine and Rehabilitation shall have the exclusive right to publish the winning essay in its official journal, the ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION.

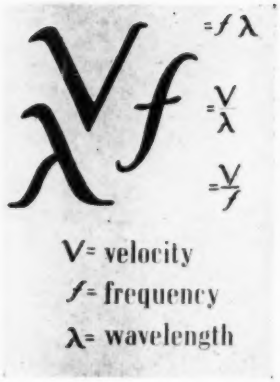
6. Manuscripts must not exceed 5000 words (exclusive of headings, references, legends for cuts, tables, etc.), and the number of words should be stated on the title page. An original and one carbon copy of the manuscript must be submitted.

7. The winner shall receive a cash award of $200, a gold medal properly engraved, a certificate of award and an invitation to present the contribution at the 32nd Annual Session of the American Congress of Physical Medicine and Rehabilitation at the Hotel Statler, Washington, D. C., September 6-11, 1954.

8. The winner shall be determined by the Annual Awards Committee composed of four members of the American Congress of Physical Medicine and Rehabilitation.

9. All manuscripts will be returned as soon as possible after the name of the winner is announced.

10. The American Congress of Physical Medicine and Rehabilitation reserves the right to make no award if, in the judgment of the Annual Awards Committee, no contribution is acceptable. The Congress may also award certificates of merit to contributors whose essays may be considered second and third best submitted. Announcement of the winner will be made after the annual meeting. Officers and members of the American Congress and the American Society of Physical Medicine and Rehabilitation are not eligible for this award.



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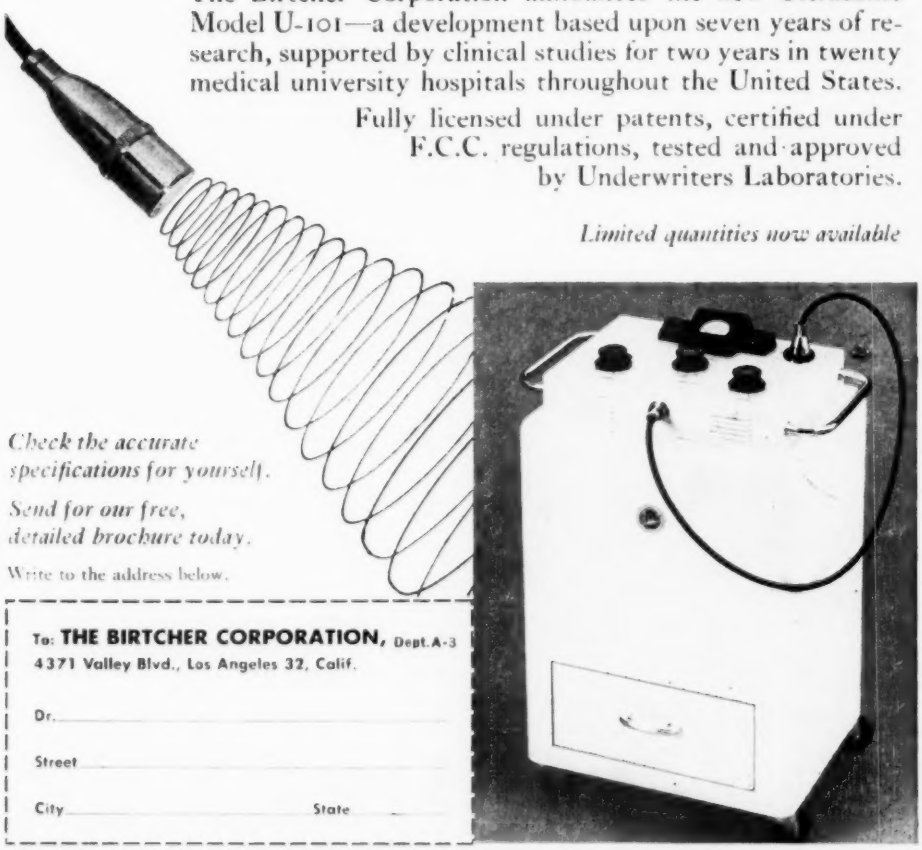

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